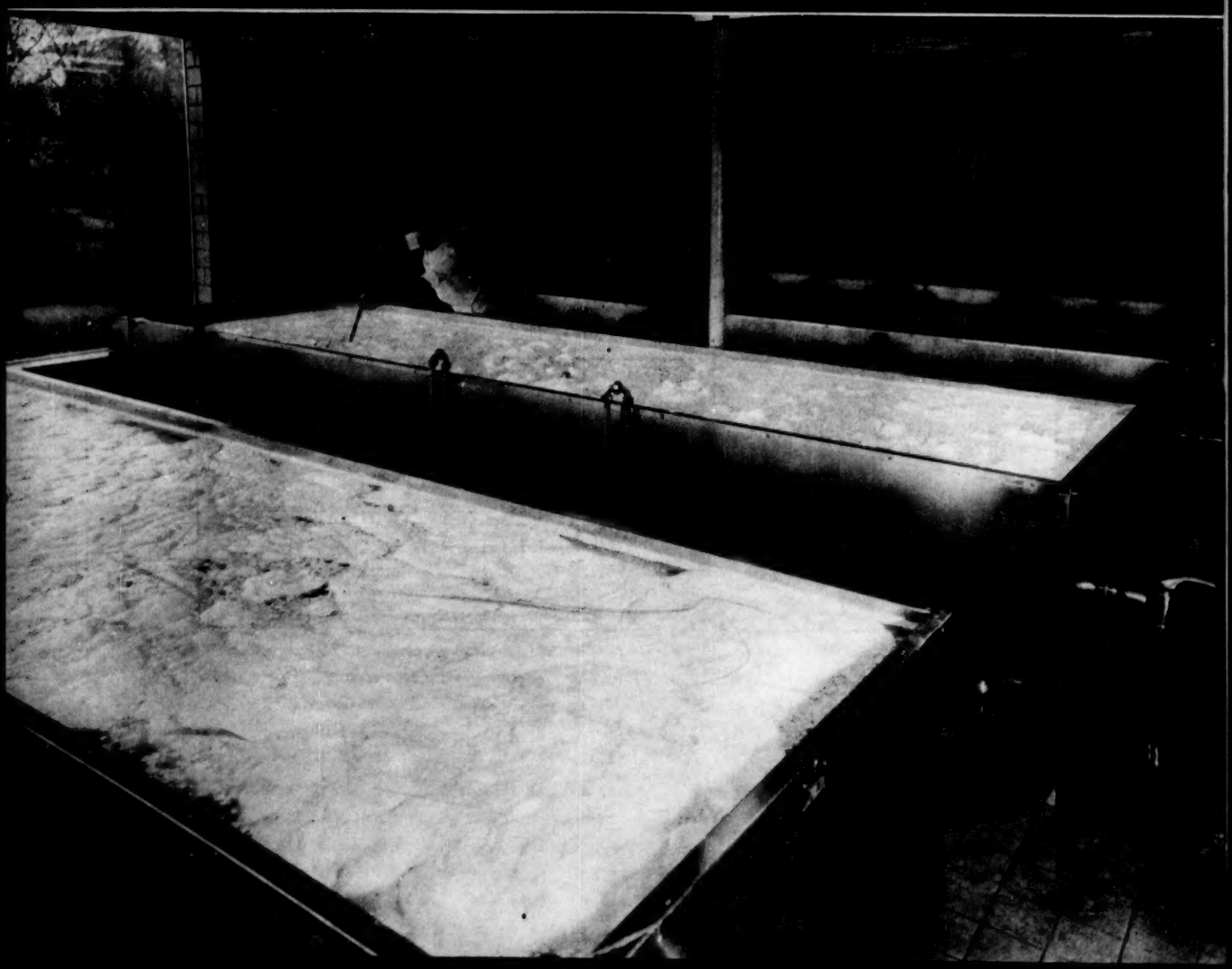
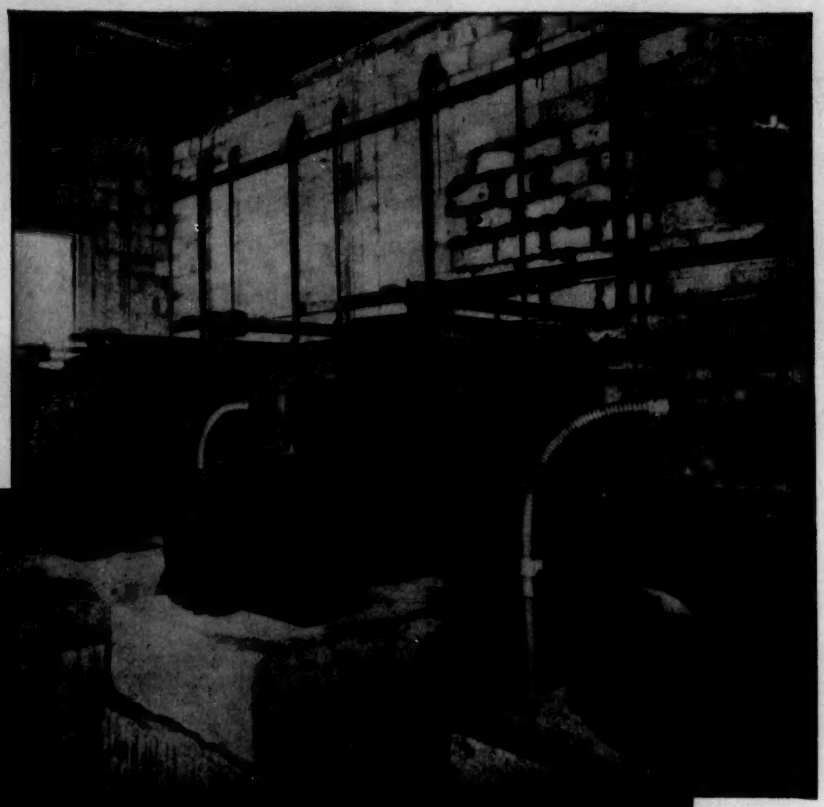
INDUSTRIAL REFRIGERATION





Use the oil that assures HIGH EFFICIENCY AT LOW TEMPERATURES

WHETHER you're cooling for air conditioning, or refrigerating down to minus 100° F., *Texaco Capella Oil (Waxfree)* is the oil to use. *It won't wax out* in the system. You can count on clean, trouble-free, top-efficiency performance.

Texaco Capella Oil (Waxfree) is outstanding for 1) low haze and floc temperatures, 2) stability, and 3) oxidation resistance. In addition, it is non-foaming, moisture-free and compatible with all refrigerants.

There is a complete line of *Texaco Capella Oils (Waxfree)* meeting all compressor requirements. Available in refinery-sealed 55-gallon and 5-gallon drums, 1-gallon cans—and the more popular grades in 1-quart containers.

Let a Texaco Lubrication Engineer recommend the one best suited to assure fine performance from your compressors. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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TEXACO

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FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

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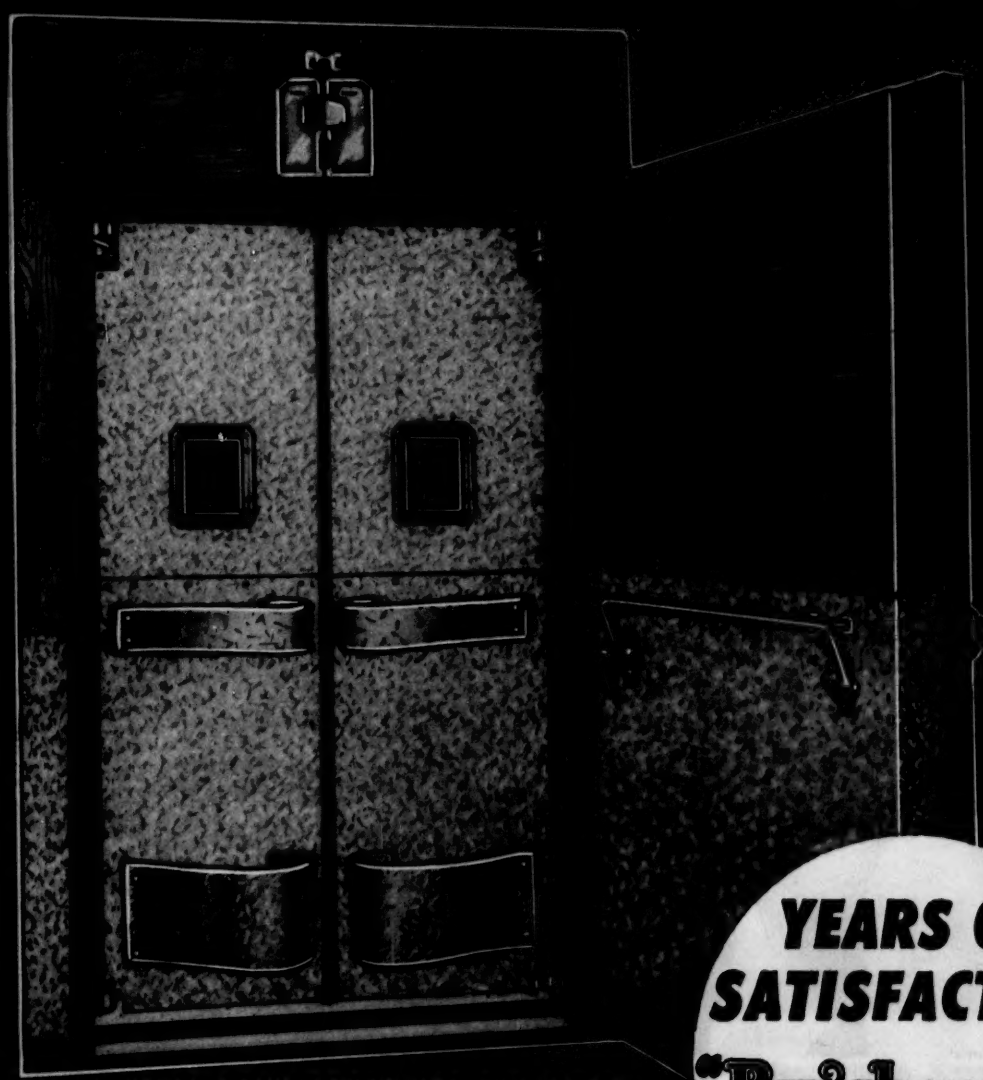

VESTIBULE TYPE TRACK DOOR

YEARS OF SATISFACTION

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HARDWARE

APPEARANCE

When a Man Thinks Twice ...He Makes Comparisons

FOOD FREEZER

5/32 PLYWOOD

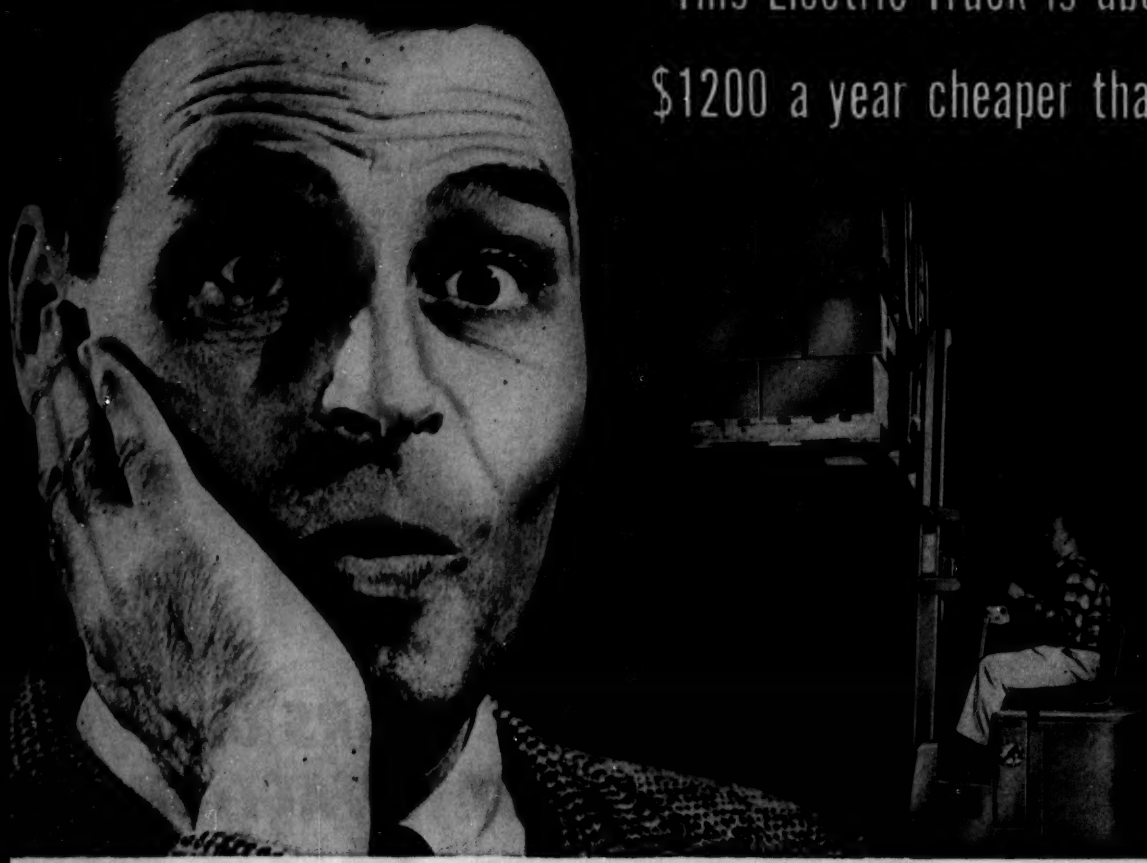
LOW TEMPERATURE

SUPER FREEZER OVERLAP

BUTCHER BOY REFRIGERATOR DOOR CO. HARVARD, ILLINOIS

WOW!

This Electric Truck is about $1200 a year cheaper than Gas!



It's a fact — and user reports prove it — Lewis-Shepard Master Electrics save you hundreds, even thousands of dollars a year.

While the figures shown are average, it's obvious that if your application is suitable to either an electric or gas truck, you'll really save with a quality-built Lewis-Shepard Master Electric.

Just look at the Model "J" advantages:

- Lubricated for life — never needs greasing — this feature alone saves many hours of maintenance.
- Safe travel speeds for indoor operation, 3 speeds forward and reverse.
- Minimum aisle requirements — tightest turning counter-balanced fork lift on the market.
- Foot controlled traction, brake, lift, lower, and tilt — leaves both hands free to maneuver.
- A quarter a day runs the "J" — compare this with the $1.36 average 8-hour cost for running a gas truck.

And remember, you can obtain the Model "J" on any of Lewis-Shepard's 6 procurement plans . . . your "out-of-pocket" costs need not be higher to get the depreciation, maintenance, and power savings indicated above.

Why not write for all the facts. Use the coupon for convenience.

ANNUAL COST COMPARISON*

(2504 operating hours)

LEWIS-SHEPARD ELECTRIC Model J — 2000 lb. cap. @ 48" load length with 130 inch telescopic mast.		GAS TRUCK 2000 lb. cap. @ 48" load length with 130 inch telescopic mast.
$480	DEPRECIATION	$750
290	MAINTENANCE LABOR AND REPAIR PARTS	920
75	POWER OR FUEL	425
$845	TOTAL	$2,095

*average figures taken from user reports

LEWIS-SHEPARD

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The Master's Line

Please send me

- ☐ L-S SpaceMaster Model "J" Catalog No. 33
- ☐ Gas vs. Model "J" Truck Cost Comparisons

Name_____

Company_____

Address_____

STAND-OUT

Role of Air Conditioning In Anti-Polio Vaccine

THE critical role air conditioning has played in the rush to mass-produce Dr. Jonas Salk's history-making anti-polio vaccine has been cited by a leading manufacturer of Air Conditioning equipment. Precision control of temperature, humidity and purity of air proved an essential key in the monumental task of bringing the new wonder substance to market at such an early date. The basic air conditioning problems were absolute prevention of contamination which could have upset tests or production and maintenance of body temperatures in solutions where tissues and virus are artificially grown.

Early in 1953 when Dr. Salk's research began looking toward production of the vaccine on a massive scale, it became necessary to employ thousands of test tubes and slides in growing and preparing tissues and virus and analyzing the results. In Dr. Salk's Pittsburgh laboratory, it was a case of unstoppering test-tube necks instead of bottlenecks. Keeping the test tubes alone sealed tightly against contaminating bacteria, yeast and mold found in ordinary air would have slowed down their work considerably.

A special system was designed and installed which pressurized the room against infiltration of outside air, and subjected the conditioned air supply to five separate purifications by filtering. At the same time humidity was held at a low level to prevent contamination of slides, tubes and other equipment by perspiration. Breakneck speed in supplying equipment to hurry up the job was a prime element in all of the air conditioning installations. In Indianapolis, Eli Lilly and Company converted an entire five-story building to polio vaccine production in less than 90 days. Here anti-contamination provisions even exceeding those found in a hospital operating room are employed in areas where tissues from monkey kidneys are prepared and placed in nutrient mediums.

In incubating rooms where tissue cells are actually grown in enclosed vats and where the strains of polio virus are planted and reproduce on the living tissue cells, special air conditioning is used to maintain body temperature of 98.6 degrees. Cooling is necessary most of the time, because of the heat from dozens of motors which rock the vats constantly.

Once the virus strains are grown they are held in rooms where a battery of cold diffusers provides a 40 F temperature. They are then tested for potency, and strained through filters so fine that ordinary bacteria, yeast, molds and other viruses will not pass through them, before being inactivated for use as a vaccine.

Industrial Refrigeration

formerly ICE AND REFRIGERATION

Now in its 64th Year of Publication

J. F. NICKERSON, FOUNDER

Vol. 128 **May, 1955** **Number 5**

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The Cover:

Cherry-Burrell Spray-type "Nu-Vats" for cheese making as described in the article starting on page 32. Pasteurizing and cooling may be done in the same vat. Steam and chilled water are the heat transfer media.

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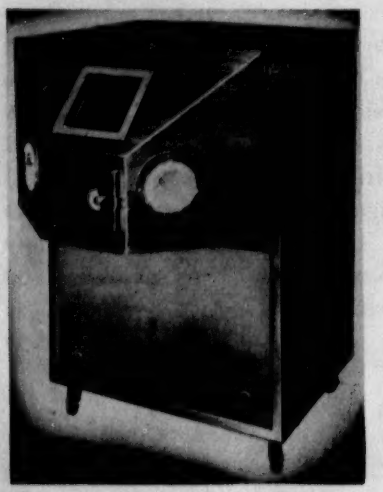
What's New

MACHINERY
APPLIANCES • PROCESSES

Microtome Cryostat For Pathological Research

A NEW Microtome Cryostat developed by the Harris Refrigeration Company, Cambridge, Mass. permits manipulation of pathological specimens at accurately-controlled sub-freezing temperatures. The unit will accommodate a rotary microtome which can be operated through gloved armholes lined with lambs wool. A non-fogging window and interior fluorescent illumination provide excellent visibility for the operator.



Microtome Cryostat Developed by Harris Refrigeration Company

Pathological research specialists have worked in close conjunction with Harris Refrigeration engineers in the design and construction of this cryostat. Experimental models have been tested over a five-year period. The Harris Cryostat has been used extensively for microtome operations on animal tissue sections at controlled temperatures near minus 17 C. Sections as thin as four microns are cut and placed between glass slides in the cryostat chamber without even momentary exposure to room temperatures.

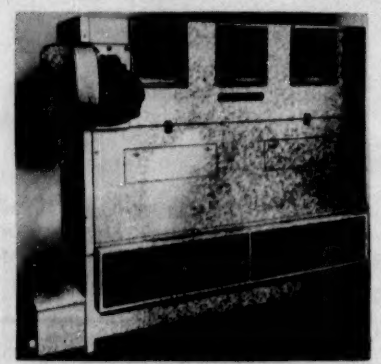
The Harris Cryostat is a valuable aid in a variety of operations at temperatures down to minus 40 C. The working chamber measures six cubic feet. Constant temperature is maintained throughout the chamber by a fast-action, hydraulic-type thermostat, accurate to 1 F, and a reliable freon refrigeration system. An external foot switch is provided to stop fan and compressor during delicate manipulations. Low wattage heaters around viewing port, door, and armholes prevent condensation.

Access to the working chamber is gained by an 8 x 4 inch specimen removal door in the cryostat nose. The entire nose section is also hinged for introducing the microtome or other equipment. Two 15/16 inch cylindrical holes are provided in the rear to accommodate suction or gas lines for chemical operations.

The exterior of the Harris Cryostat is finished in all-welded, stainless steel. Rubber-wheeled castors provide mobility. The working chamber, finished with a hot-sprayed zinc coating, is easily cleaned. Chamber-wall refrigerant piping has been eliminated by honeycombed channels formed in the walls. Total weight is 400 pounds. Power requirements range from 500 to 1400 watts depending upon the desired temperature range.

Acme Announces New Flow-Mizer Cooling Towers

A NEW Flow-Mizer line of cooling towers, with capacities from 15 through 100 tons at 75 F wet bulb and a water saving efficiency of up to 97 percent, has been announced by Acme Industries, Jackson, Mich. Throughout the new line, centrifugal blowers are used to induce quiet, constant velocity air flow with ample capacity for use with ductwork, when needed. The wetted metal deck principle of water-to-air heat transfer is employed, with Acme's Z design, all-metal cooling pak delivering maximum cooling capacity in a minimum cubic feet of space. This results in towers that are exceptionally compact for their ratings and that require little or no maintenance of pack surfaces.



The New Acme Flow-Mizer Cooling Tower

Servicing has been made convenient and easy by locating the sump outside the tower. Water treatment basket, removable sediment screen that can be quickly cleaned, and an ingenious combination waste-drain-and-overflow fitting are all reached by removing the sump cover.

Hot-dip galvanizing after fabrication provides a finish on all sections of these towers, including blowers. Other features include large convenient access doors, flush-type and splash-proof air inlets, and integrally-mounted, bronze-fitted pumps.

Anemostat Announces New Air Meter

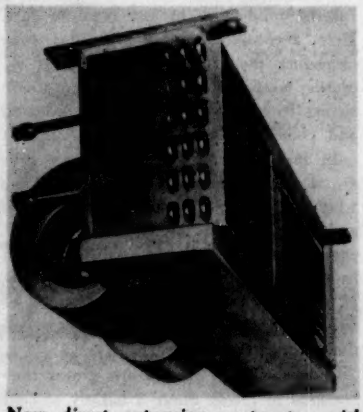
A PORTABLE "Anemotherm" air meter which gives instantaneous direct readings on air velocity, air temperature, and static pressure in heating, ventilating, and air conditioning systems has been redesigned by Anemostat Corp. of America. The new air meter measures velocity from 10 to 8,000 fpm in increments as small as 5 fpm, temperature to 225 F with an accuracy of about one-half of a degree, and static pressure directly in terms of inches of water from 0 to 8 negative and positive with a sensitivity of better than .05 inches at lower range.

The new redesigned portable Anemotherm Air Meter

The meter, which is contained in a convenient carrying case, may be used in ducts, free spaces, and at air inlets and outlets, and is suited for both field and laboratory work.

New Direct Expansion Evaporators With Blowers

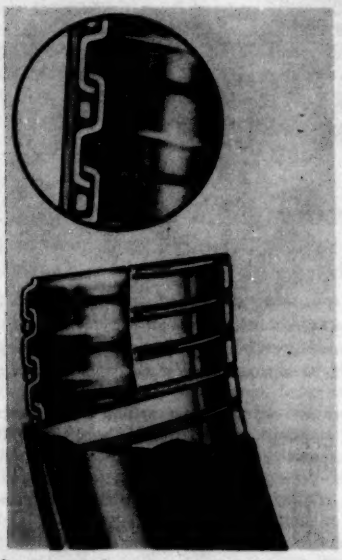
A NEW line of direct expansion evaporators with blowers is announced by Peerless of America, Inc., Chicago. This line of units is available in ½, 1, 1½, and 2 ton capacities. Ceiling mounting permits installation in attics, closets, vestibules or out of the way places. Units are also available with condensate pump and for cold water.



New direct expansion evaporator with blower

New Flexible-Metal Electrical Wiring Conduit

A NEW flexible-metal, electrical wiring conduit, fully enclosed in a tough, waterproof, synthetic cover is being marketed by the Universal Metal Hose Co., of Chicago. It will be known as Type U20SCB with black synthetic cover with square locked construction, galvanized steel core, aluminum wire wound on sizes ⅜ to ¾ inch, and Type U20SCG with gray synthetic cover available from ⅜ to 2 inch conduit sizes.



Cutaway and cross-sectional view of electrical wiring conduit

This new conduit provides complete protection against moisture, dirt, oil, fumes, and chemicals. It is ideally suited for applications requiring flexibility for connections in tight places, for connecting wires on machinery constantly operating in excessive oil or moisture, and for applications of extreme vibration. The Type U20SC Conduit is said to be lightweight and easy to install.

Powers Pneumatic Relays Provide Versatile Control

AMONG other air operated devices for control systems, Powers Regulator Company has developed the Type 1139 Averaging Relay used most frequently in air conditioning control installations. Either two or three supply pressures from pneumatic thermostats and/or gradual acting hand valves are parallel piped to the relay. The pressure output from the relay in psi is the arithmetic average of the input supply pressures.

Specific application illustrations are as follows: (a) The supply pressure from an outdoor thermostat is averaged with the output from an indoor thermostat to cause a change in heating or cooling as the outdoor temperature changes. (b) A large room is zone controlled for heating by several unit heaters but cooled by a central system. In the winter each thermostat controls one unit heater. In the summer thermostat output pressures are fed to an averaging relay. The central cooling system is controlled by the averaging relay output. (c) A gradual acting hand valve in the boiler room is used to change the control point of a thermostat

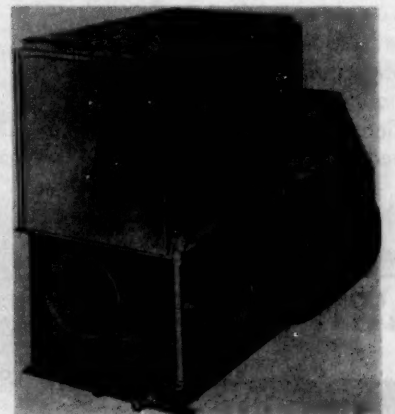
New Powers Averaging Relay

at a distant point. Working through an averaging relay a pressure change from the hand valve has the same effect on the position of a coil valve as if the thermostat output pressure had changed. (d) On an industry processing cooler, the pressure outputs from temperature controllers and pressure controller are averaged to determine the flow rate of the material through the process.

When more than three return line pressures are to be averaged, a combination of several two and three point relays can be used to give the desired average pressure.

New Evaporative Condensers and Cooling Towers

A NEW line of evaporative condensers and cooling towers are being manufactured by the Baltimore Aircoil Company, Inc. These units are manufactured in capacities of 10 to 50 ton rating, based on Dichlorodifluoromethane rating, available in 5-ton increments. This improved design, it is claimed, offers maximum capacity with minimum space requirements.

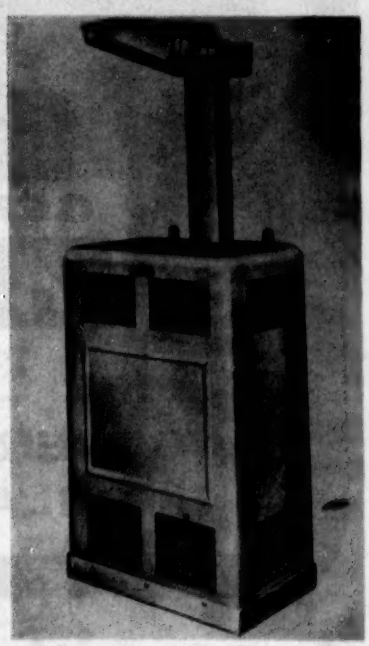


New Baltimore Aricoil evaporative condenser.

Casings are finished outside with BAC Zinc-Chromatized Aluminum Paint. An additional protection, fan wheels and eliminators are treated with zinc chromate primer before finish coat is applied. Fan wheels and scrolls are all galvanized construction. Fan scrolls are coated inside and out with BAC special mastic.

Truck Refrigeration System Uses Ice

A NON-MECHANICAL truck refrigeration system that requires no maintenance is being used in many industries where a high-moisture, constant temperature of 40 to 45 F is required. The Air Induction Conditioners use water-ice, and operates on the principle that warm air rises. Warm air is drawn from the top of the truck, circulated over the ice, and forced out along the truck floor.



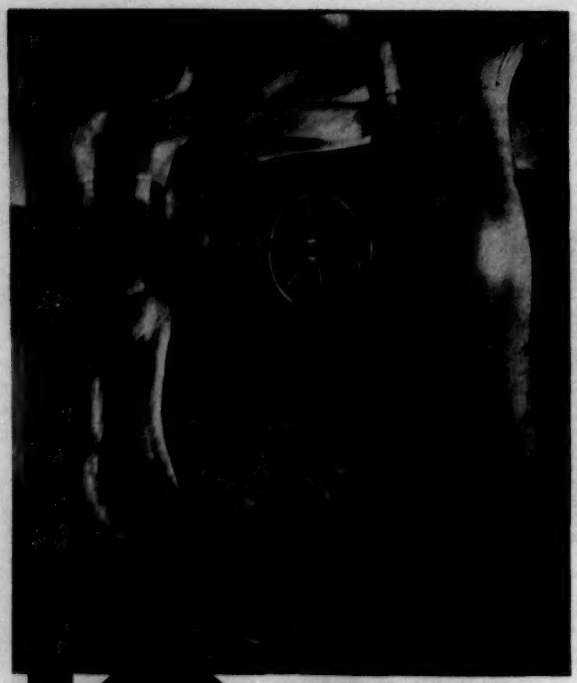
Air Induction Conditioner Truck Refrigeration System

In this way, all the air in the truck is completely rewashed and cooled every 2 or 3 minutes when the unit is in operation. The small fan is operated by a 6-volt DC motor connected to the truck battery, and draws about the same power as an ordinary hot water heater.

The use of water-ice as a refrigerant provides advantages of economy, convenience and ease of purchase, safety of handling, freedom from fumes, and maintenance of the high-humidity cold that is best for keeping perishable products fresh.

Night holdovers are possible through the use of a packaged set which consists of a transformer, 2-way switch, plug and wiring. The unit can be plugged into any electrical outlet and operated independently of the truck battery.

Models of the Air Induction Conditioner are made in various sizes to refrigerate insulated trucks having capacities of from 150 to 600 cubic feet.



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Write for Bulletin No. 300

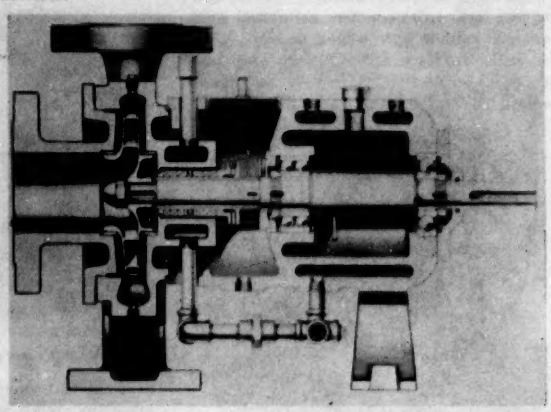
NO SHAPE IS TOO COMPLEX

AMERICAN HAIR & FELT COMPANY

MERCHANDISE MART • CHICAGO 54, ILLINOIS

Process Pumps Feature Interchangeability of Parts

INTERCHANGEABILITY of parts is a feature of a re-engineered and completely integrated line of single stage, end suction, centrifugal process pumps by Dean Brothers Pumps Inc., Indianapolis, Ind. Objective is simplification of design and construction, to meet the requirements of today's industrial pumping services.



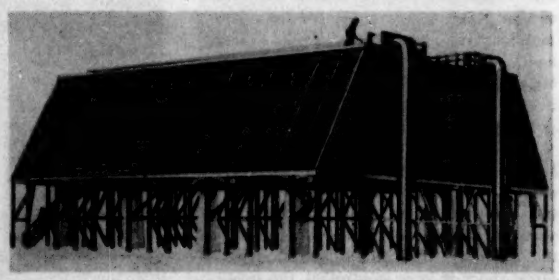
Longitudinal section showing standard cradle assembly (right) with casing, suction nozzle and impeller (left). Capacity of pump is determined by size of these three parts. All other parts are completely interchangeable.

In the R-10 series, there are eleven pumps ranging in size from 1x2 to 4x6 inches. One standard cradle assembly serves for all eleven pumps. Size and capacity of each pump is determined by variations in the size of three parts, the casing, impeller and suction nozzle. Enclosed cradle; drain rim base; labyrinth, non-sparking bearing seals; rabbetted joints; alloy steel studs; and stuffing boxes interchangeably adapted to packing or mechanical seal are standard construction.

For high temperature services up to 850 F, three series with a total of 32 pumps are available for capacities from as low as 3 gpm up to 7,000 gpm. The same pumps are available and interchangeable in three parallel or companion series for temperatures up to 350 F. Every pump in the line is available in any of five standard material classifications. Pumps can also be furnished in other commercially available material. Interchangeability of parts is made easy by the simplicity of replacement parts stocks. In any one series, one pump shaft fits all pumps. Likewise, one stuffing box gland, one seal ring, and so on for all parts which may require replacement.

Cooling Tower Controls Recirculation

THE cooling tower division of Santa Fe Tank and Tower Company, Inc., Los Angeles, has announced what promises to be a new prototype in cooling tower design. Representing a rearrangement of a standard tower's component parts, the new Santa Fe "Wind-trol" claims the distinct advantages of improved operating efficiency by controlling recirculation and increased functional life span with reduced maintenance requirements.



Showing Structural Design of "Wind-trol" Cooling Tower

It is said the new design shows marked indications for completely eliminating the hampering effect of wind on its performance. The new "Wind-trol" tower can therefore be located without respect to wind direction. The change in arrangement, according to the company, nullifies the effect of recirculation caused by the tower structure upon itself. Uncontaminated air is allowed to pass freely beneath the structure and supply fans on both sides of the tower, with an excess of air discharging from the tower's leeward side. Recirculation is prevented, since the exhaust vapors must move against this discharging wind stream. The control of recirculation and winds inherent in the "Wind-trol" design makes the return to a forced draft tower both practical and highly economical.

Mounted on an open substructure, the new tower and its redwood basin are supported by "cast-in-place" concrete piles. Drilling the holes for these piles is easily accomplished with a mechanical auger and without using forms. The forced draft fans, which are individually mounted on the ground on either steel pipe columns or small concrete structures, are not connected to the "Wind-trol's" structure. The fans are located outside of the packing area, discharging vertically in the external, vertical plenum area; and are placed so no harmful sunlight, rain, or hot vapors come in contact with blades or machinery.

Sealed Circuit Refrigeration Featured In New Truck Body

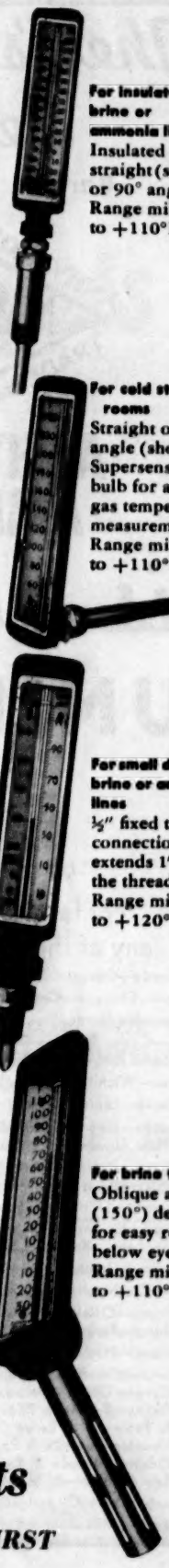
A NEW truck body featuring a York Truck Refrigeration System that provides continuous cooling and accurate temperature control for the dairy and other perishable food industries has been announced by Boyertown Auto Body Works, of Boyertown, Pa. Mounted in an advanced designed, fully insulated Boyertown body the new system features a compact, hermetically sealed York unit designed for over-the-road operation.

The refrigerating unit is housed in a single small package requiring less space than five milk cases and weighs less than 200 pounds. It offers a weight saving of almost 900 pounds over other heavy, bulky systems.

Mounted in a newly designed Boyertown Truck body is a compact hermetically sealed circuit refrigeration system built by York Corporation.

Inside the truck body the system consists of a complete packaged York hermetically sealed refrigeration system with two large cooling and two large circulating fans. The generator is engine mounted and the voltage regulator is neatly stowed under the dashboard. The York sealed circuit system permits the truck to generate its own continuous refrigeration during normal delivery throughout the day. At night the unit is simply plugged into a convenient electrical outlet, thereby eliminating the need to transfer any undelivered merchandise to coolers. Another money-saving feature is the use of AC instead of DC power.

Taylor Industrial Thermometers are Accurate Rugged and 3 times Easier to Read!



For insulated brine or ammonia lines
Insulated stem, straight (shown) or 90° angle. Range minus 40° to +110°F.

For cold storage rooms
Straight or 90° angle (shown). Supersensitive bulb for air and gas temperature measurement. Range minus 40° to +110°F.

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PRESS BRIEFS

ASRE Transfers Time Capsule To Franklin Institute

THE American Society of Refrigerating Engineers held dedication ceremonies at The Franklin Institute April 8 formally transferring their time capsule to the custodianship of the Institute. The time capsule was sealed in Philadelphia November 29, 1954, on the occasion of the recognition of the 50th Anniversary of the Society. Containing the records of the arts and sciences of Refrigeration and Air Conditioning, the capsule will be held at the Institute until the 100th Anniversary of the Society in the year 2004 A. D. The national officers and members of the Society's Executive Committee, as well as many members of the Philadelphia Section, attended the affair this afternoon.

The Society's President, Leon Buehler, Jr., chief engineer of the Creamery Package Manufacturing Company, Chicago, introduced the guests and conducted the formal transfer of the capsule. The Franklin Institute was officially represented by Dr. John Burlew, assistant director of the Institute, and Dr. I. M. Levitt, director of the Fels Planetarium.

Richard Jordan, American Society of Refrigerating Engineers; past president, University of Minnesota, A. H. Lawrence, Jr.; Du Pont, Dr. Edgar Ross; and representatives of the Institute emplaced the capsule and set the plaque. Edward Simons, Chairman of the Anniversary Committee, delivered the dedication statement and closed the ceremony.

Frozen Food Conventions 1956 New York 1957 Miami Beach

THE 1957 National Frozen Food Convention will be held during the week of January 6, 1957 at Miami Beach, Fla., according to a joint announcement made by E. J. Watson, Chairman, Convention Committee, National Association of Frozen Food Packers and W. M. Walsh, Chairman, Convention Committee, National Frozen Food Distributors Association. The headquarters hotel will be the Fontainebleau, but arrangements for additional rooms at nearby hotels will be made to meet the growing requirements of the annual meetings of the frozen food industry.

The national frozen food packer and distributor associations recently sponsored the most successful convention ever held by the frozen food industry. This was the 1955 convention, held in Chicago, March 13-16. The meetings next year will be in New York City, during the week of January 29, 1956, headquartered at the Waldorf Astoria.

Because of the increasing size and business activity at the annual frozen food conventions, the convention period will be extended to four days in 1956 and thereafter instead of the three-day duration of the industry conventions in past years.

New Food Processing Plant

A NEW $100,000 food processing, storage and office building will be occupied by Rich Plan Inc., Utica, N.Y. Complete processing and frozen food storage facilities are provided in the new building. Food processing work will be concerned mainly with meat and poultry although there will be freezer storage space for other frozen foods.

New Seafood Warehouse Plant

CONSTRUCTION of a modern refrigerated warehouse and seafood processing plant is planned by the Quincy Market Cold Storage and Warehouse Company and Gorton-Pew Fisheries Co., at Gloucester, Mass. Over a million dollars will be spent by Quincy in the construction of a two-story concrete and masonry refrigerated warehouse to hold 12 million pounds of frozen fish. The warehouse will be on the Gloucester water front with deep water facilities for unloading large ships from Canada, Iceland and other foreign countries. The plans also include 12 truck bays to assure a minimum of handling during loading and unloading.

In line with the modernization and consolidation of Gorton's varied processing plants currently under way, Gorton-Pew Fisheries will construct a three-story connecting building which will house its new frozen foods plant for processing and quick-freezing. It is expected Gorton's will open its building, which will cost over half a million dollars on January 1, 1956.

Regulation of Abandoned Refrigerators

A BILL outlawing the abandonment of old refrigerators without removing the doors has been signed by Governor Leader of Pennsylvania. "This is good legislation," the governor said, "countless lives will be saved by it. I want to commend the legislators who sponsored the bill, and in particular, the public spirited citizens who supported it."

Under terms of the bill, any person who abandons an ice box with doors "in any place accessible to children" is liable to a $50 fine or 30 days in prison or both. The ban also applies to freezers or cabinets with a capacity of 1½ cubic feet or more.

A bill to guard children against accidental entrapment and death in abandoned ice boxes or other airtight containers has been signed by Governor Muskie of Maine. The measure provides for a fine up to $50 imprisonment up to 30 days or both for discarding an ice box or other container in which a child could become trapped.

Northwestern Packer to Build Warehouse

NORTH Pacific Canners & Packers, Portland, Ore., will start construction immediately of a 160 carload warehouse and office for Flav-R-Pac Frozen and Canned Foods at SE 18th Avenue and McLoughlin Blvd. F. M. Smith, president of North Pacific, said the new facility will cost over $400,000.

The new warehouse for both cold and regular storage will have 30,000 square feet. There will be a breakup room for frozen foods.

The refrigerated warehouse will be 162 by 122 feet with 18-foot ceiling clearance and is designed for temperatures down to 20 degrees below zero. It is insulated with foam glass and has a ventilated bottom slab to prevent frost heaving conditions.

Explosion Damages Refrigerating Plant

EXPLODING fumes in the refrigerating plant caused an estimated $100,000 damage to the C. A. Swanson & Son Co., plant at Salisbury, Md., one of the country's largest poultry processing plants. Two firemen were injured slightly and about 500 employees fled when ammonia fumes in the refrigeration machinery apparently exploded, spreading fire through a storage building. It was wrecked.

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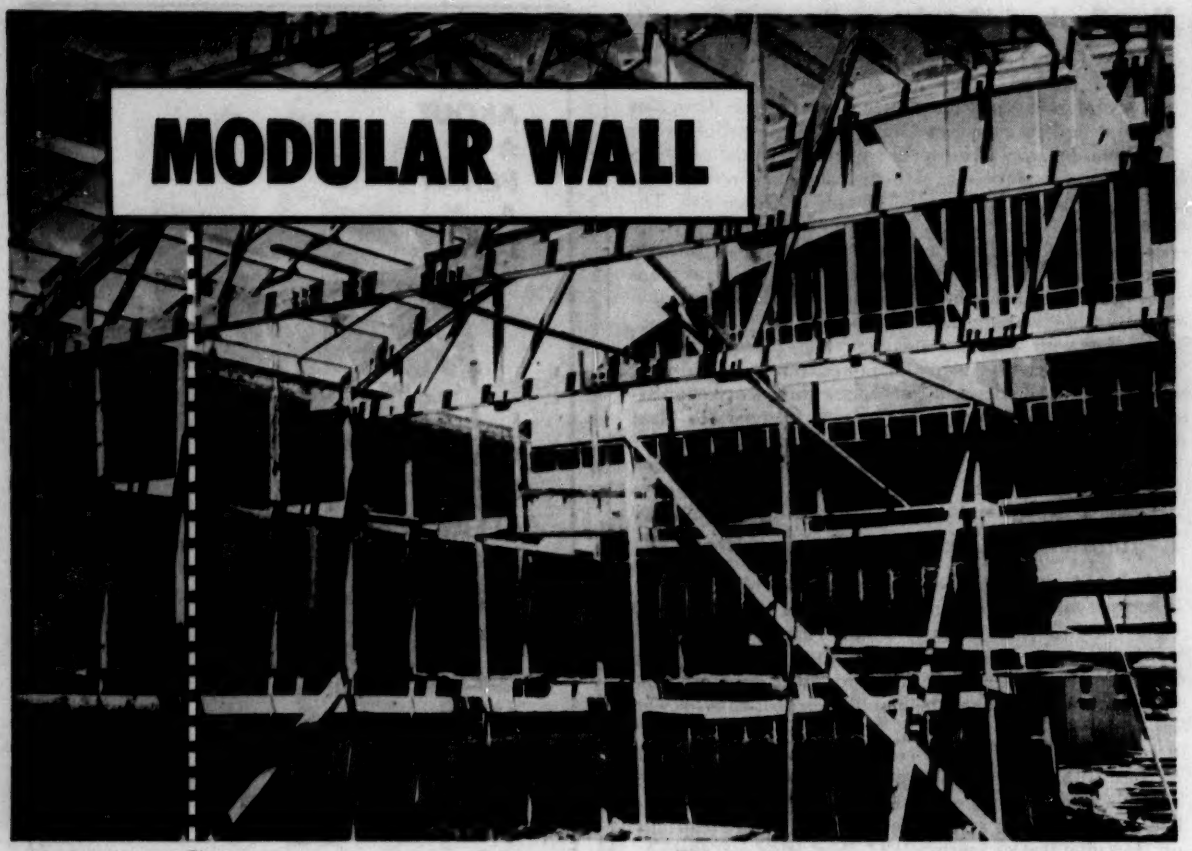

Typical modular wall engineering illustrates use of horizontal insulation board bridging on 4' to 8' centers. This facilitates uniform control of Palco Wool Insulation density and permanent void-free efficiency. Note how insulation remains in place for final inspection of entire wall before interior sheathing is applied.

—AIDS DENSITY CONTROL FOR PERMANENTLY VOID-FREE PALCO WOOL INSULATION

Division of open walls into modules by horizontal blocking and bridging, required by many building codes, also provides for the most efficient installation of Palco Wool Insulation:

1—Proper allocation of material can be made for more uniform fill-pack density.

2—Permanence of void-free installation can be assured, since lifetime resilience of Palco Wool packed to proper uniform density is easily self-supporting in normal modular areas.

Horizontal dividers should be of approved insulation board so as not to detract from overall insulating efficiency of Palco Wool, which can be put in place through entire wall areas and fully inspected for void-free application before interior sheathing is applied. For the most effective cold storage insulation available, specify Palco Wool with modular wall design.

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In the Spotlight

THE AMERICAN Warehousemens Association returned to the Edgewater Beach Hotel, Chicago, for the sixty-fourth annual convention April 13 - 16. Refrigerated warehousemen met in conjunction, starting Wednesday April 13. Attention was directed toward current problems including labor and legislation through panel discussions and committee reports. A good attendance was present and interest was high at all of the sessions. A membership meeting of The Refrigeration Research Foundation was held the day before the opening of the NARW Convention. The Merchandise Division of the AWA also met at the same time. Reports of meetings start on page 13.

NEW PRODUCTS for storage is a subject of outstanding interest to refrigerated warehousemen of today. An approach to this angle of building new business was offered in a talk which is briefed on page 23.

A FROZEN FOODS Symposium of industry leaders was held at the closing session of the National Frozen Food Convention in Chicago to discuss the outlook for the immediate future and pressing marketing problems. The concensus of opinion was that the future looks bright and effective steps are being taken to meet the principal problems. A summary of the points made is presented on page 24.

REGIONAL MEETINGS are being held throughout the country by the National Association of Ice Industries to bring members up to date on the new ice merchandising ideas. For report of meeting held in connection with the Ohio-Indiana joint convention see page 29.

REFRIGERATION is an important utility required in the dairy industry; it provides facility for storage, and is essential to preservation of rich natural flavors of the products. Upon the shoulders of the plant engineers falls the responsibility of maintaining satisfactory and economical performance of the mechanical equipment. A comprehensive description of the refrigerating equipment in a modern milk plant, with all the protective requirements for preserving the product from point of production to the consumer is given in the article starting on page 32.

ANOTHER article on new refrigerants, this one on Freon compounds, is offered by a leading refrigeration engineer. He tells about the advantages of Freon and while his opinions are not held by all refrigeration engineers, his discussion of the subject with accompanying illustrations should be of much value to the practical engineer in the larger refrigerating industries where many of the "new" refrigerants are being introduced. The article describes gases best used with various types of compressors, gives data on chemical make-up, and a chart lists those commercially available by their trade names and chemical formulas. The article starts on page 43.

AN ICE SKATING rink is in operation in Chicago with plastic piping and "uniflo" system, permitting headers to be frozen directly into ice skating surface, thereby eliminating necessity of header trenches or boxes. The rinks are a roll-away type which can readily be taken up and laid down. For description and pictures see article on page 25.

FROZEN FOOD Transportation problems demand constant watchfulness according to speakers at a conference on this subject held in connection with the National Frozen Food Convention. Some of the high points of this conference are listed in the article on page 42.

REFRIGERATED Warehousing is becoming more and more the distribution nerve-center of the Frozen Food industry", said John Fox, Minute Maid-Snow Crop president, at the Refrigerated Warehousing Industry's luncheon during the Frozen Food Convention. Mr. Fox also stated that "more packer warehouses will be built; but that this development would not affect materially either the present situation in public refrigerated warehouses, or the future of that industry."

POPULATION of The United States is expected to increase to 207 million people by 1970 and this increase should be accompanied by a food sales gain from $64 billion annually to $116 billion. This was pointed out at an Executive Board Meeting of the Frozen Food Industry at the closing session of the National Frozen Food Convention held in Chicago.

FROZEN FOODS will have another record sales gain of between ten and fifteen percent in 1955. The largest increases are foreseen for newer type products like fish sticks and complete frozen dinners according to frozen food leaders.

Keeps in Touch With Industrial Refrigeration

Auckland, New Zealand

I am following the affairs of NAPRE with interest and you will appreciate what a difference it makes in reading INDUSTRIAL REFRIGERATION over here, when one has met the personalities featured from time to time.

WILLIAM J. SYME
FARMERS' FREEZING CO. LTD.

South of the Border

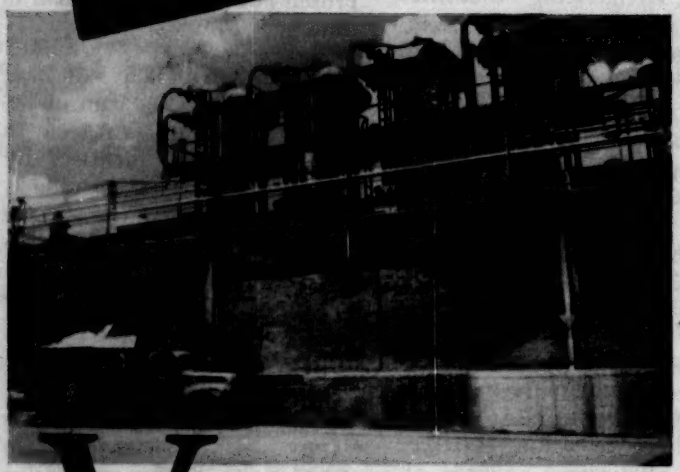
200 tons daily capacity

TUBE-ICE MACHINES

INSTALLATION

for **Cerveceria Cuauhtemoc, S. A.**

Monterrey, Mexico



This leading Mexican brewery installed two Vogt Tube-Ice Machines to serve their Monterrey plant several years ago, and two additional units were recently placed in operation to meet increased plant production.

Mounted on top of the ice storage building, a total of 200 tons of crushed Tube-Ice is discharged daily from the battery of ice machines to the storage room beneath. The ice is used for keeping beer cool during delivery by trucks and is supplied free of cost to refreshment stands and beer gardens where the product of Cerveceria Cuauhtemoc is sold.

In addition to making ice, distinctly versatile Tube-Ice units can be easily adapted to the production of cold water for wort cooling in any brewery. Write for Bulletin TI-3.

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Vogt Automatic TUBE-ICE MACHINES

American Warehousemen's Association Sixty-fourth Annual Convention

THE sixty-fourth annual convention of the American Warehousemens Association was held at the Edgewater Beach Hotel, Chicago, April 12-16. It attracted an attendance of nearly 800 members, associate members and guests.

Meeting jointly were the two AWA Divisions, the National Association of Refrigerated Warehouses and the Merchandise Division. On Tuesday afternoon the annual membership meeting of The Refrigeration Research Foundation was held and that evening a dinner meeting of the TRRF Board of Directors was held, at which officers were elected.

A. B. Efroymson
Retiring President AWA

The high-light of the AWA program was a luncheon meeting Wednesday at which an address was presented by Clement A. Johnston, former president of AWA and now president of the United States Chamber of Commerce. At this meeting the "Man of the Year" award was presented to Mr. Johnston. Other speakers were J. L. Keogh, Director, Storage Distribution and Disposal, Department of Defense, and Dr. Allen Stockdale of the National Association of Manufacturers.

Wednesday morning a press conference was held, attended by representatives of Chicago newspapers and the trade press. Comments were made by Mr. Johnston on the general economic picture and industry questions were answered and discussed by A. B. Efroymson, AWA president. Commenting on the proposed annual wage, Mr. Johnston said he couldn't see how it could provide additional security for workers, observing that it would destroy more security than it created.

AWA OFFICERS FOR 1955

President: I. S. Culver, San Francisco, Calif.
Vice-President: M. W. Young, San Francisco, Calif.
Treasurer: Willard A. Morse, Minneapolis, Minn.
Secretary: Wm. Dalton, Washington, D.C.

The entertainment program for the ladies consisted of a tea and reception Wednesday afternoon, a luncheon at the Chez Paree on Thursday, a party at Don McNeill's Breakfast Club Friday morning, a tea and reception Friday afternoon. The usual convention entertainment was the AWA Family Party and reception, followed by a dinner and floor show, and the President's reception and the 64th annual dinner Friday evening.

Man-of-the-Year Luncheon

At the Man-of-the-Year luncheon, reports of the officers were presented and addresses were delivered by two featured speakers, Mr. Johnston and J. L. Keogh, Director Storage Distribution and Disposal, Office of Assistant Secretary of Defense, Supply and Logistics.

A. B. Efroymson, president of AWA, presided and introduced the guests and speakers. In his annual report, Mr. Efroymson said they had planned to build a program that would be of value to all members. In this, he said, he thought they had been successful. The work of the association, through the two Divisions, he said, had consisted mostly in contact with government agencies, including legislative, on the labor question, taxes and government competition. Both Divisions, he said, pointed their activites toward progress and prosperity of the industry.

E. G. Erickson, representing the General Convention Committee, welcomed the members to Chicago. They had planned what they hoped would be an informative as well as an enjoyable program.

Willard D. Morse, treasurer, presented the financial report. This report showed the association was in a solvent condition, with a small increased balance over last year.

Warehousing and the Pentagon

J. L. Keogh brought the members up to date on what has been going on in Washington that is of interest to the industry. He described the setup of the Storage Division and the objectives of the various sections. Warehousemen, he said, naturally want the government to withdraw from ownership and operation of storage facilities, but, such achievement must not be made at the price of national security.

A. B. Efroymson, AWA President, presents "Man-of-the-Year" Award to Clement D. Johnston

Among other plans, there is now one on foot for the utilization of commercial warehouses under which a single contract will be available with each warehouseman, or group of warehousemen, to cover all federal government agencies. Under this, a central committee would be provided to determine federal requirements and their distribution by specified areas.

The Department is now receiving reports on availability and utilization of storage space on a uniform basis from the four military services, which will allow them to do a more competent job that will lead to better space utilization. Also, a ruling has been made providing that the warehouses owned and operated by one military service are available for the use of the other three services, which is an important step toward economy. A few months ago the four military services and the Storage Division, started preparation of a storage and materials handing manual which al-

(Continued on page 20)

Refrigerated Warehousemen Annual Meeting Discuss Problems and Review Progress

PANEL discussions, addresses, reports of officers and committees, and special features made up the program of the annual convention of the National Association of Refrigerated Warehouses meeting at the Edgewater Beach Hotel, Chicago, April 13-16. Starting Wednesday morning, six sessions were held and, in addition, a breakfast for the First Timers.

M. W. Young, San Francisco, Calif. Past President NARW

Panel discussions, always a high point of interest, covered a wide range including warehouse operation in moderate sized plants, engine room operations, the legislative situation, man-hour production, and an executives forum. Outstanding reports were presented by the cold storage research advisory committee, on studies of factors pertaining to refrigerated warehouse construction, by the cold storage industry advisory committee, on government in refrigerated warehousing, and a report of the Insurance Committee.

First Timers Breakfast

The annual first timers breakfast of the National Association of Refrigerated Warehouses was held Wednesday morning at 8:00 am. attended by approximately fifty "first" timers and a considerably larger number of old timers. M. W. Young, president of NARW presided and introduced the new members. Late news flashes were read by William Small, radio commentator of WLS Radio Station, Chicago.

Garth Shoemaker, on the subject "It's Your Business—And How" said all those in the warehousing industry should realize and appreciate the contribution made for them by this country offers a brilliant opportunity through increased sales and increased production which creates new jobs. The increased population means new opportunities based on the freedom to create. Don't be afraid to try new things, he advised. America is alive and growing and the future looks very bright for all.

Harlan J. Nissen, newly elected president of the Refrigeration Research Foundation welcomed the first timers on behalf of the Foundation and sketched briefly its facilities which, he said, had been organized for their benefit. The immediate future he said, would also include widened activities of research on the

Wm. Dalton, Washington, D. C. Exec. Vice-President NARW

subject of management and economics, and referred specifically to the greater opportunities afforded by the increase in population and the problems created by shifts in population in some parts of the country.

Officers for 1955

President, F. D. Newell, Jr., Minneapolis, Minn.
Vice-President, Gilbert J. Stecker, Louisville, Ky.
Treasurer, William E. Ready, Indianapolis, Ind.
Executive Vice-president, Wm. Dalton, Washington, D.C.
Secretary, Joseph Colquitt, Washington, D.C.

Executive Committee: The officers and Richard Doncaster, Holly, N.Y.; C. P. Swanson, Seattle, Wash.; Charles E. Adams, Jersey City, N.J.; R. C. Muckerman, St. Louis, Mo.; R. W. Oakley, Jersey City, N.J.; Charles Henry, Atlanta, Ga.; John L. Bear, Wichita, Kans.; Wm. Giacomazzi, Jr., San Jose, Calif.; P. V. Henningsen, Portland, Ore.; S. A. Kadane, Dallas, Tex.

NARW and the Refrigeration Research Foundation. The Refrigeration Research Foundation especially he said is contributing valuable information through its research findings, but it is only through the active participation of all members that it can accomplish what it should. Let us all reaffirm our faith in the warehouse industry, he concluded, and realize that business leadership is a public trust.

Dr. Allen A. Stockdale of New York "The Pitching Parson" gave an inspirational talk specially directed to the first timers. Such an occasion, he said, gives them an opportunity to get new outlooks and make new contacts. Americans, he commented, are inclined to take too much for granted the things in American life that make for better living, especially as contrasted with the way the people in other countries have to live. The first timers have an opportunity here to see the results of being associated with a forward looking group.

But along with these new contacts, he said, they had the responsibility of learning to sell their story to the American people. For one thing, the enormous growth of population in

Opening Session

The convention was opened Wednesday morning, called to order by M. W. Young, president of NARW. Greetings were extended by A. B. Efroymson, president of AWA.

The treasurer's report, presented by John K. Dozier, showed a very satisfactory balance, with the dues situation in much better condition than ever before. As a whole, he said, the entire financial condition could be classed as very satisfactory.

M. W. Young, in his president's report, said the warehousing industry is growing and the association is growing along with it. The membership has increased and with this expanded growth, association activities also have increased. Bulletins from

the association office have kept the members informed on what is going on. Everything done, he said, has been done in relation to the needs and interests of the members, and with membership at an all-time high, requests for services have been greatly increased.

Among the services provided are information on labor, safety work, public relations and publicity, government relations, government competition, the annual warehousing directory. The Chapters are growing in strength and importance, and their programs are being aligned closely with the work of the Association. One new service is a pamphlet that is being prepared telling about the services available from refrigerated warehouses for distribution to customers. Mr. Young concluded his remarks by commending the present office staff for their efficient handling of the association business under the capable direction of Wm. Dalton, executive vice-president.

A suggested change in the by-laws to permit the president and vice-president to serve for two consecutive years, instead of only one year, to conform to the AWA and merchandising divisions, after some discussion failed to pass.

Safety Awards

A report by A. R. Carstensen, chairman of the Safety Committee explained the work of the committee and said that definite progress had been made toward a better safety record during the three years of the Committee's work. But in spite of the progress made, the record of the industry is still unsatisfactory as shown by the following safety figures: Frequency: 1952, 38.85; 1953, 36.94; 1954, 32.06. Severity: 1952, 1.84; 1953, 1.378; 1954, 1.24. The frequency rate, is seventh from the bottom in the national average of all industries.

He asked that all companies file their safety reports as requested. To further the cause of safety, the association now has under preparation a pamphlet showing why a company safety program should be instituted, and how to organize and conduct such a program for all companies, large and small.

He then presented the companies who had been cited for outstanding plant safety records during last year. The plants qualified by going one or two years without a lost-time industrial accident.

The five companies which received the two year awards were: Diamond Ice and Coal Company, Charleston, W. Va.; Commercial Storage Company, Memphis, Tenn.; National Ice and Cold Storage Co., Stockton, Calif.; Scottsbluff Ice and Storage Co., Scottsbluff, Neb.; the United States Cold Storage Corp., Detroit, Mich.; Tyler Cold Storage Co., St. Louis, Mo.; Polar Cold Storage Co., Sioux Falls, Iowa.

Those which received the one year awards were: Beall Refrigerating Co., Santa Clara, Calif.; Central Storage and Warehouse Co., Madison, Wisc.; Colonial Ice Company, Greensboro, N.C.; Roanoke Ice and Cold Storage, Roanoke, Va.; Cumberland Warehouse Corp., Bridgeton, N. J.; Fairmont Foods Co., Columbus, Ohio; Fairport Storage and Ice Corp., Fairport, N. Y.; Federal Cold Storage Co., Pittsburgh, Pa.; Houston Terminal & Warehouse Co., Houston, Tex.; Jax Ice and Cold Storage Co., Jacksonville, Fla.; Jones Cold Storage Corp., Norfolk, Va.; Merchants Refrigerating Co., Hopkins, Minn.; National Ice and Cold Storage Co., Petaluma, Calif.; National Ice and Cold Storage Co., Oakland, Calif.; National Ice and Cold Storage Co., Santa Rosa, Calif.; Scobey Fireproof Storage Co., San Antonio, Texas; Standard Ice and Fuel Co., Charlotte, N. C.; The Terminal Cold Storage and Ice Company, Dayton, Ohio; Terminal Warehouses of St. Joseph, Inc., South St. Joseph, Mo.; Union Ice and Storage Co., Santa Cruz, Calif.; Union Ice and Storage Co., Chico, Calif.; the United States Security Warehouse, Columbus, Ga.; Harborside Warehouse Co., Jersey City, N. J.

New officers NARW: Center, F. D. Newell, Jr., president; Left, Gilbert J. Stecker, vice-president; Right, William E. Ready, treasurer.

Cold Storage Research Advisory Committee

The report of the cold storage research advisory committee presented by Paul B. Christensen, chairman, offered the following general recommendations for future work of the Department of Agriculture:

Expansion of Agricultural Research and Information; Basic Research in refrigeration and handling agricultural products; Federal, State and Industrial Cooperation in Industrial Research; Wider dissemination of research findings through the Information and Extension Services; More complete statistical data for evaluating national food stock of agricultural perishables and semi-perishables.

The committee recommends that one or more department representatives familiar with problems in the field of refrigeration be designated to attend the 9th International Congress of Refrigeration to be held in Paris, France, August 31 to September 15, 1955. The committee commended the action of the department for assigning packaging representatives to several research advisory committees, including the cold storage committee.

Increased attention, the report stated, should be given by those responsible for research programs to the development of integrated programs within a given field rather than undertaking a large number of small isolated projects which may be unrelated to each other.

Recommended for new and expanded work were a large number of subjects covering a wide range of research work.

Reports on Business

A series of reports were presented by Chapter representatives on business conditions and the outlook in their respective areas. Although there were some unfavorable aspects, as

Panel on Man-Hour Production Clinic. Front row, R. M. King, Syracuse; A. B. Efroymson, Cleveland; M. W. Young, San Francisco. Back row, Thomas Murphy, Watertown; V. C. Stevens, Dallas; Kenneth Stepleton, Chicago; Frank Prusa, Cleveland; John Mock (moderator) Evanston; John Moore, New York; Wm. Giacomazzi, San Jose; James Gallery, Boston; R. C. Heiser, Cleveland.

usual, for the most part they were optimistic and classed the future outlook as satisfactory.

John J. Byrne, representing the North Atlantic Chapter, said that occupancy was somewhat lower than last year and there were some increase in costs, including labor. The outlook however, he said, is favorable, with probably increased occupancy.

C. A. Bowen, representing the Southeastern Chapter, said that drought and cold weather, together with labor unrest, were unfavorable factors in that section. But frozen food products are increasing, and based on soundness of the industry as a whole, they expect to be able to overcome these temporary setbacks.

S. A. Kadane representing the Southwestern Chapter, reported that general conditions are good. Industry is on a boom, with new plants going in in many sections, labor relations are satisfactory, all of which make for a favorable outlook. On the other hand demands for increased wages have pushed costs up, and because of the drought the future is not too bright. But the picture as a whole could be classed as optimistic.

E. L. Winterman representing the Missouri Valley Chapter confined his remarks to the activities of the Chapter. It is a very active chapter, he said, with quarterly meetings which serve to keep all the members in close touch with each other and with local problems.

D. B. Stearns, representing the Great Lakes Chapter reported continued prosperity in that section, although one unfavorable aspect is increased construction of storage space by individual storers. Occupancy appears to be down somewhat, with about 77 percent overall. On government butter and cheese there is still a rather high occupancy. Some new products coming into the picture seem to offer prospects for new business in the future.

Wm. Giacomazzi, representing the South Pacific Chapter reported that the west coast had its best year in 1954. Currently occupancy is down a bit and there is some uncomfortable competition from producers and chain stores who have installed their own storage facilities. There is also considerable government competition in that area. On the whole the future looks very encouraging, he said.

G. F. Olsson, representing the South Pacific Chapter, reported that general prosperity in that section was a favorable factor. Building permits are up, payrolls are increasing, unemployment is somewhat less than last year. However, cold storage occupancy is at a low point, down slightly from the 5-year average and lower than any other section in the country. Increased sales of frozen foods has caused them to be moved out of storage earlier than usual, which makes for decreased occupancy of that line. However, with all these, the future prospects are considered satisfactory.

Executive Committeemen Elected

Adopting the report of the Nominating Committee presented by H. C. Emerson, the following members of the Executive Committee were elected for a term of three years:

Wm. Giacomazzi, San Jose, Calif., representing the South Pacific Chapter.

John Bear, Wichita, Kans., representing the Missouri Valley Chapter.

S. A. Kadane, Dallas, Tex., representing the Southwestern Chapter.

Paul Henningsen, Portland, Ore., member-at-large.

Insulation Research

A session sponsored by The Refrigeration Research Foundation was held Wednesday afternoon at which a report was made on the latest developments in insulation and related factors in refrigerated warehouse insulation. This report was presented by H. C. Brown, Jr., of the Research and Development Center, Armstrong Cork Company.

Mr. Brown gave a report on some of the developments from a research study conducted by Armstrong Cork. Some time ago, he said, a rather unique facility was constructed at the Armstrong Research and Development Center for testing insulated structures. It had been felt for years that there was a real need for obtaining certain data on refrigerated buildings, pertaining particularly to heat flow through insulated walls, floors and ceilings and various structural members. Although work has been done in developing laboratory methods of measuring thermal conductivities of insulation, there was some question as to whether these values would remain the same when the installation was actually installed. Accordingly this test facility was set up.

The test facility consisted essentially of a small building inside an outer building to enable complete control of variable factors in the interior and exterior. The inner building was approximately 20 feet square with a ceiling height of 10 feet and the outer building was about 50 feet in diameter. Temperatures in the inner room could be cycled from minus 100 F to plus 200 F, or maintained at any level within this range. The outer room temperature could also be similarly controlled. In both rooms the humidity could be controlled from a low level to essential saturation. Over 500 thermocouples, representing some eight miles of lead wire, were extended from various locations in the inner and outer room to the recording instruments.

Mr. Brown explained that this test work is not sufficiently far along to reach any definite conclusions, but it was thought that a brief description of the methods used and some preliminary indications would be of interest. The preliminary results obtained so far were shown in a series of slides reproducing charts and diagrams.

Some preliminary results were shown on on-grade freezer floor ventilation; the effect of air movement on temperatures; use of vapor barriers; the effect of air impingement against insulated walls with no interior finish compared to applied finishes of different types; thermal data obtained from the outside walls, studies of roof insulation installed in

different ways; the cause and prevention of floor heaving due to sub-floor freezing, and other points.

Results of these tests, he said, have a considerable bearing on the cost and performance of insulation. One of the preliminary results also showed that more ducts and shorter spacing helps to relieve temperature fluctuations.

In the discussion period following this presentation, it was brought out among other things, that soil with clay content are more apt to cause floor heaving than are those with sand content. It depends upon the location of the water table how long it will take freezing to come up sufficiently to affect the floor. If heat balance can be maintained under the floor this will defer freezing. Some cases were reported of floors behaving satisfactorily over a period of five or six years before being affected by sub-floor freezing.

Closing the session, H. C. Diehl, TRRF Director expressed appreciation to the NARW for providing time on a busy program for a discussion of this subject, which they considered very important. This study when finished, he said, would be an outstanding contribution to the information on the important subject of the behavior of insulation under a variety of conditions.

Panel Discussions

The Thursday afternoon session was given over to a series of three panel discussions on warehouse operations in moderate sized plants; engine room operations; and legislative developments.

Warehouse Operations

The panel on warehouse operations was directed by Charles E. Adams of Jersey City, N.J. as moderator. Other panel members were John L. Bear, Wichita, Kans.; R. H. Bratnober, St. Paul, Minn.; Richard Doncaster, Holley, N.Y.; J. R. Goodfellow, Seattle, Wash., W. C. Hudlow, Chattanooga, Tenn.; Wm. Schellhase, Canton; Bert Veenker, Sioux Falls, S.D.

Among the questions discussed was one on keeping inventory to coincide with customers' inventories. One company furnishes duplicate lists when requested, for a small clerical charge. A card system is used by another, with very good results.

Regarding use of limited truck dock space, one plant uses skids, fully loaded in the warehouse for placing on the truck which conserves truck and dock space and reduces the time required for loading.

In regard to using pallets and or skids, one company reported use of skids with hand lift trucks and a fork truck at both ends of the operation. Another question discussed was the method used for paper work covering withdrawals in relation to deliveries.

Panel on NARW Executives' Forum. M. W. Young, San Francisco in front. Back row: Gilbert J. Stecker, Louisville; F. D. Newell, Jr., Minneapolis; H. C. Diehl, Colorado Springs; Harlan J. Nissen, Los Angeles; John Mock (moderator) Evanston; J. H. Kuehn, Milwaukee; R. C. Muckerman, St. Louis; Arthur N. Otis, New York; Wm. C Baker, Chicago.

Engine Room Operations

A panel discussion on engine room operations was directed by L. R. St. Onge, York, Pa., as moderator, the balance of the panel consisting of John J. Byrne, New York; H. L. Brooks, New Orleans, La.; J. C. Irwin, Kansas City; W. Irving Moss, Jr., Kansas City; Paul Vollmer, Chicago, Warren Wilson, Camden, N.J.

This opened with an extended discussion of automatic operation. It is common practice, it was pointed out, to use more or less complete automatic control in the engine rooms of new plants, but for the older plants, it was felt that having a competent operator on hand provides better and safer performance.

Automatic safety shut-downs however are useful. The general opinion seemed to be that while the fully automatic method is not as yet completely acceptable, partly automatic controls are very useful. They are especially valuable for operating engineers who do not know all the technical details. One suggestion was that automatic controls be installed gradually and others added as their need or usefulness becomes apparent.

In regard to engine room safety, the following points were indicated as important: installation of gas masks; checking the ventilation and controlling it with fans; use of safety valves wherever needed; use of distinctively colored pipe lines. A. R. Carstensen, chairman of the Safety Committee announced that a safety code covering this point was being developed and would be offered for adoption.

Legislation

The subject of legislation was covered by J. P. Johnson, New York, chairman of the NARW Legislative Committee, and P. G. Kuehn, vice-chairman.

Mr. Johnson announced that legislative developments as they affect the warehousing industry were brought up to date in a recent issue of the "Quick Sheet" issued by the Association. He pointed out that legislation is a most important subject to the industry, not only to resist unfavorable, but to encourage favorable legislation, at the national and at the state level.

The Association's efforts in this, he said, must be backed up by work of the members themselves. As a means to this end they must get acquainted with their Congressmen and Senators and their state legislators and make their views known to them. Current legislation, he said, is very important and cooperation of the members is needed to protect the interests of the industry. State legislation is being watched by the Chapters, but they also need the support and backing of their members.

Among the current legislative activity that is important now is retaining the "right to work" laws of several of the states, and labor regulations. It was the recommendation of the Committee, Mr. Johnson reported, that a full-time legislative assistant be added to the staff of the Association, whose duty it would be to keep informed on this work, and advise when help of the members was deemed necessary.

Philip G. Kuehn said it is quite apparent that members of the Association do not take the active interest they should take in legislative problems. They cannot leave it all to the Association. Present national legislation is very important and to accomplish the things that need to be done, all must take an active interest. The

American businessmen, he said, are acknowledged leaders in the economic and business world, but in legislation and government they have conceded leadership to other forces, many of which are not favorable to business.

The Taft-Hartley Act, it is generally understood is here to stay, but amendments probably will be offered, and the effect of these amendments, quite likely, would be to weaken the regulation. A live issue at the present time is an increase in the minimum wage regulations, and it is likely that this will be increased from 75 to 90 cents an hour, although some measures would push it as high as $1.25.

The guaranteed annual wage is a huge question and a very controversial one and this will become more alive in the weeks to come. Regarding the right to work laws in various states, he pointed out that the Taft-Hartley Act specifically provides that the states shall have the right to pass legislation making membership in a union not a requisite to employment anywhere.

Concluding, he reiterated that the attitude of business men generally toward legislative questions and government is entirely too passive, while other forces, including labor, are well informed and very active. He urged that for their own good they take more interest in this important subject.

Report of Cold Storage Industry Advisory Committee

The report of the Cold Storage Industry Advisory Committee was presented by John H. Dean, Washington, D.C., assistant deputy administrator price supports, USDA. Mr. Dean told about the organization and procedure of the Committee, which was organized about a year ago. Most of the time since then, he said, has been spent in getting acquainted with the job, and making up an agenda of what they expect to accomplish. The committee was formed, he said, to integrate and centralize the problems of warehousing in relation to the government, and to provide for free exchange of information. The Committee, he further explained, was made up of warehouse representatives from all sections of the country.

He reviewed meetings of the committee held at Washington, Cincinnati, New York and Chicago and advised that the chief accomplishments of these meetings had been to finding out what needed to be or could be done, and developing an agenda.

One of the decisions was the centralization of storage responsibility which places the operation of the commodity storage problem for all but seven states within the Cincinnati office. This makes it possible to conduct the program with wider distribution in the facilities offered by the industry.

It is intended that this Committee be maintained permanently as an advisory group and meetings will be held in different sections of the country as deemed advisable.

At the Cincinnati meeting the following statement of Policy on "Allocation of Commodities to Cold Storage" was unanimously adopted.

When storage is required, the Cincinnati office will review the list of warehouses which have available space. The following factors will be given consideration in making the actual selection of the warehouse to receive the commodity. Storage rates, transportation cost from the point of production to the storage location, storage-in-transit benefits available, ability of warehouseman to load commodities in and out, the quantity of CCC-owned commodities now in store and the space reported as available for CCC-owned commodities, whether the commodity will go for export or will be used for domestic use, the normal pattern of trade channels for the particular commodity, giving consideration to normal marketing centers, etc.

All warehousemen desiring to do business with the Cincinnati CSS Commodity Office have been requested to make known the availability of space in their warehouses on the 1st and 15th of each month. The Cincinnati office generally will not contact any warehouse for the storage of its commodities unless storage availability information is currently furnished.

Production Idea Clinic

The Friday morning session was an all-industry session for both the Merchandise and NARW Divisions, on the subject of man-hour production. It was designed as an inquiry into specific problems of man-hour production in all types of refrigerated and merchandise warehouse operations, in the light of present and future developments in the field of labor, new equipment, automation, new products, customer service and cost reduction.

The panel, with John Mock of Evanston, as moderator, consisted of: James Gallery, Boston; Wm. Giacomazzi, San Jose, Calif.; John Moore, New York; Frank Prusa, Cleveland; Kenneth Stepleton, Chicago; V. C. Stevens, Dallas; Thomas Murphy, Watertown, N.Y.; representing Lewis-Shepard Co., and R. C. Heiser, Cleveland, representing Moto-Truc Inc.

Opening the discussion, Wm. Dalton, executive vice-president NARW, presented a prepared paper on "Today's Future and Tomorrow's Man Hour Problems." He discussed automation in industry, chiefly from the standpoint of its effect upon the warehousing industry. He said they had already seen its beginning in warehouses, where fork lift trucks, conveyors, and automatic engine rooms are finding constantly increased use. It is his conviction he said, that we will see developments in handling operations in our warehouses which will make today's latest model fork truck seem like a second hand push cart. He discounted completely the fears of some that it will decrease jobs and throw workers out of employment.

Now, in our day, he said, there is talk of a guaranteed annual wage, which has a direct and unalterable relation to automation, because there's only one way to actually guarantee a continuous wage and that's when someone guarantees that everything that is produced will be bought! (Including warehouse services and space), The money can come from no place except sales! Sales can be guaranteed only when workers can produce more goods and more services at greater value to the buyer! The worker, by and large, has reached his own capacity. So he has to depend on better and better machines. So only he can guarantee his own wage by using those machines and using them to capacity. That's automation.

He called attention to a recent statement by President Eisenhower that because of automation there will be more rather than less work in the years ahead. He pointed out that it was foolish to assume that the amount of work to be done would ever remain static in a dynamic and expanding economy.

The forward looking, progressive warehousemen, he concluded will be ever alert to exploit to the fullest these new machines, new ideas, new methods. He is the warehouseman who will get and keep the competitive advantage in tomorrow's warehousing operations.

Panel Discussion

In the panel discussion, a question was asked as to whether newly constructed buildings had brought increased man-hour production. The answer was that it has because of the

mechanical handling devices it was possible to use. A new plant has the advantage of being built around the idea of using fork trucks and palletizing. Although multi-story houses are limited in use of mechanical handling equipment, they are able to shift men from one department to another. There are also modified fork trucks and other equipment that has been devised for use in such warehouses.

A multi-story operator reported that their operation had been successful from their standpoint and they were satisfied with it. They have been able to maintain a maximum utilization of space, labor, and speedy handling, which has brought increased man-hour production. It was pointed out also that equipment manufacturers have greatly assisted management through devising new tools adapted to their operations.

A question was asked as to how handling time in multi-story plants, not adapted to fork trucks, can be reduced. The answer was the use of storage racks and the use of small fork trucks and straddle trucks specially devised for such operations. Another suggestion was the use of wooden skids loaded on the dock and moved into the storage room.

A point was raised as to satisfactory figures on man-hours in handling. It was admitted that such calculations would be very valuable to the industry, but conditions are such that each plant would have to make up its own figures. Also it depends largely upon what is included in the operation, the size of the cartons or other units, and the amount of mechanization. It was generally agreed that a somewhat higher figure can be attained in handling the usual merchandise warehouse products than that of refrigerated storage. Another point was made that one criterion could be established; that of handling the required volume, with the regular crew, and with no overtime, could be considered a satisfactory operation.

The part supervision has in this operation is considered very important, to see that an even flow of work be maintained, and that each worker understands just what he is to do.

A locating system should be used to keep track of where each lot or group of merchandise is located so that when shifted there is no danger of losing track of it. For this, adequate records are necessary and the office worker doing this work must be competent. Supervisory training also is important to the proper use of equipment. That this be clearly understood is more important than direct consideration of the use of man-power and it was stressed that equipment should be used with the same efficiency as man-power is used.

Regarding a question as to whether mechanization would always increase man-hour production, the answer was that it depends upon the building layout. Some have found it more profitable to use both hand and mechanized operation, depending upon the product and arrangement of the space. Mechanization will increase the amount of goods possible to be handled.

Executives' Forum

The Friday afternoon session was given over to an executives' forum in which a group of top-level executives took a look at finances, labor, research and sales, and discussed developments and problems in these fields, and their meaning for the future of refrigerated warehousing. John Mock of Evanston acted as moderator, with the following panel members: Arthur Otis, New York; Wm. C. Baker, Chicago; F. D. Newell, Jr., Minneapolis; Gilbert J. Stecker, Louisville; Harlan J. Nissen, Los Angeles; H. C. Diehl, Colorado Springs; R. C. Muckerman, St. Louis; J. H. Kuehn, Milwaukee.

Opening the discussion, Mr. Otis gave a discussion of the economic outlook. He said the advent of frozen foods had greatly affected the refrigerated warehousing industry, and that they are also faced with new competition of big processors and other big storers. To meet this situation he said the industry must make a special effort to meet the new demands for service. Old warehouses are faced with the necessity of operating efficiently in face of the competition of the newer, more efficient houses.

The business is changing rapidly, he pointed out, and one big need is modernization of facilities and service. This is a responsibility of all warehousemen. The future will bring unforeseen changes, new products, etc., which will have to be met. In regard to the immediate future, it was his opinion that the economic outlook appears to be favorable and that there will be plenty of goods to be stored and that there is good reason to expect good business.

Today's Sales — Tomorrow's Business

R. C. Muckerman discussed the subject of today's sales in relation to tomorrow's business. He commented that tomorrow's business would depend upon today's sales, and tomorrow's sales would depend upon today's efforts. One important factor, he said is that a decrease of government storage will leave those who have been depending upon public storage rather than government commodities, in better condition to maintain adequate occupancy.

In looking to the future, he said, the first objective should be to provide service that will meet the needs of customers so they will remain customers. He advocated that they be made fully aware of what facilities the warehouse has to meet their needs and how it can serve their needs. The warehouse also must be aware of changing conditions and be in position to take care of new commodities as the need for their storage arises, and to take care of all commodities that are offered for storage.

Harlan J. Nissen spoke on the value and necessity of research in the industry. Management needs everything available that will be helpful to meet the needs of the present, he said. One of the most valuable tools of management is that of research. There are practical values in developing new products for storage, efforts which will bring about increased storage of older products, lengthened storage through improved service, improved packaging, materials handling, package stabilizing, door improvement. All of these and many more needs can be provided by research. But it is important that this new knowledge be applied to individual plants and that the employees have a working knowledge and understanding of the new ways of doing things.

Labor Relations

A discussion of what's ahead in labor relations was presented by F. D. Newell Jr. He talked about the activities of labor, especially in relation to the warehousing industry and advised the members to become fully informed as to these proposed activities. He said there is a move on foot by union leaders to completely unionize the warehouse industry.

Following these presentations, a very lively general discussion ensued, pointing up the more important points that had been brought out. Major factors in the business situation, it was pointed out, are the probable decrease in government goods in storage, higher costs of operation especially that of labor, changing demands from customers, and the increasing tendency of larger storers to build and maintain their own storage space.

In regard to cultivating new products, warehousemen were advised to be aware of their plant facilities and needs of customers, so that they will be prepared with complete information.

The effect of technological progress on research, it was pointed out, is an important factor. Research is needed to provide information on how to meet the new technology. One favorable factor is the increased nutritional knowledge, much of which emphasizes the need for refrigeration.

Regarding the increasing aggressiveness of labor unions, it was suggested that a committee be formed to keep the members fully informed on all such activities and to contact labor leaders for the purpose of working out with them a program of mutual benefit. The Taft-Hartley Act and the Right to Work laws in various states, it was stated, are valuable laws and constant vigilance must be exercised to keep them unchanged.

Commenting on the amount spent on research, it was reported that some of the larger companies outside of the warehouse industry, spend between 1½ to 2 percent of their gross income. Although the income of The Refrigeration Research Foundation does not attain this figure, according to H. C. Diehl, director, it is adequate. The Foundation, in addition to using its own funds, works cooperatively with other research organizations and thereby is able to have the use of a vast amount of research equipment and personnel at a nominal cost.

Among the probable significant changes of the future, it was suggested that more knowledge of costs is needed, labor saving devices and methodology, new institutional markets, changes in distribution, installing their own warehouse space by wholesale grocers and others, and the need to acquaint such customers with knowledge as to costs and other risks of such facilities and show that as a whole, going into this line may not be profitable. Storage at point of production being undertaken by some large processors, however, it was stated, may be more economically sound. This whole field of competition can be met, it was stated, by a future study of how the warehouse can provide better and less costly service and when needed, to provide customers with special services to meet their needs. Technical know-how is a valuable asset.

Costs, both visible such as labor, and hidden, are continuing to go up while labor efficiency is decreasing. Maintenance costs are up. Operating savings must be based on knowing costs, the product being handled, the layout of the plant, loading and unloading conditions.

The cure for labor troubles, and especially labor encroachment on management, it was suggested was corrective legislation. In this connection a motion was presented and passed that a Labor Committee be formed by the Association, and a labor director be employed to keep in touch with legislative activities and to encourage such corrective and other legislation as might be desirable.

Closing Session

At the final session Saturday morning, two important reports were presented, resolutions were adopted and the new officers were installed.

Reporting for the Insurance Committee, A. Gordon Janney covered two main points, fire insurance and legal liability. The Chicago group is now negotiating on revised legal liability specifications which will be of interest to the industry and when ready members of the Association will be advised by a special bulletin. In regard to fire insurance, progress is being made to reclassify the refrigerated warehouse industry to eliminate some high-risk industries. Information is now being requested of all members to provide figures on their insurance costs and the amount collected in claims for fire loss. This will be used by the Committee in their plans to seek reduced fire rates.

The Resolutions Committee presented a resolution, which was passed, asking the Association to take steps to oppose any proposed extension of government warehouses on the ground that the refrigerated warehouse industry can take care of such storage more efficiently and more economically.

Developments concerning government in the refrigerated warehouse industry were reported by Valle O. Appel. Mr. Appel prefaced his report by quoting President Eisenhower to the effect that government should move out of private business as fast as feasible to the end reducing government expense and increasing income through added taxation. The refrigerated warehousing industry, Mr. Appel, stated, has the ability and the space to take care of all government needs and for this reason construction of additional space by the government would be unnecessary and wasteful. The proposed plan of "dumping" refrigerated space by the government was criticized as damaging to the business.

American Warehousemen's Annual Convention

(continued from page 13)

ready has been very beneficial in attaining uniformity.

In his opening remarks, Mr. Johnston recalled that AWA and the United States Chamber of Commerce were related historically because AWA was one of its organizers. He pointed out that the most revolutionary force in the world today, next to Christianity, is competitive capitalism, which is usually called free enterprise. This capitalism, he said, is inclined to liberate forward-driving forces as contrasted to a planned economy which is inclined to put artificial restraints on those forces. But, while giving a form of lip service to free enterprise, we have an increasing blanket of controls and restraints, with a resulting attrition of energy and initiative which might well prove fatal. Getting the government out of competition with private enterprise would be a step in the right direction.

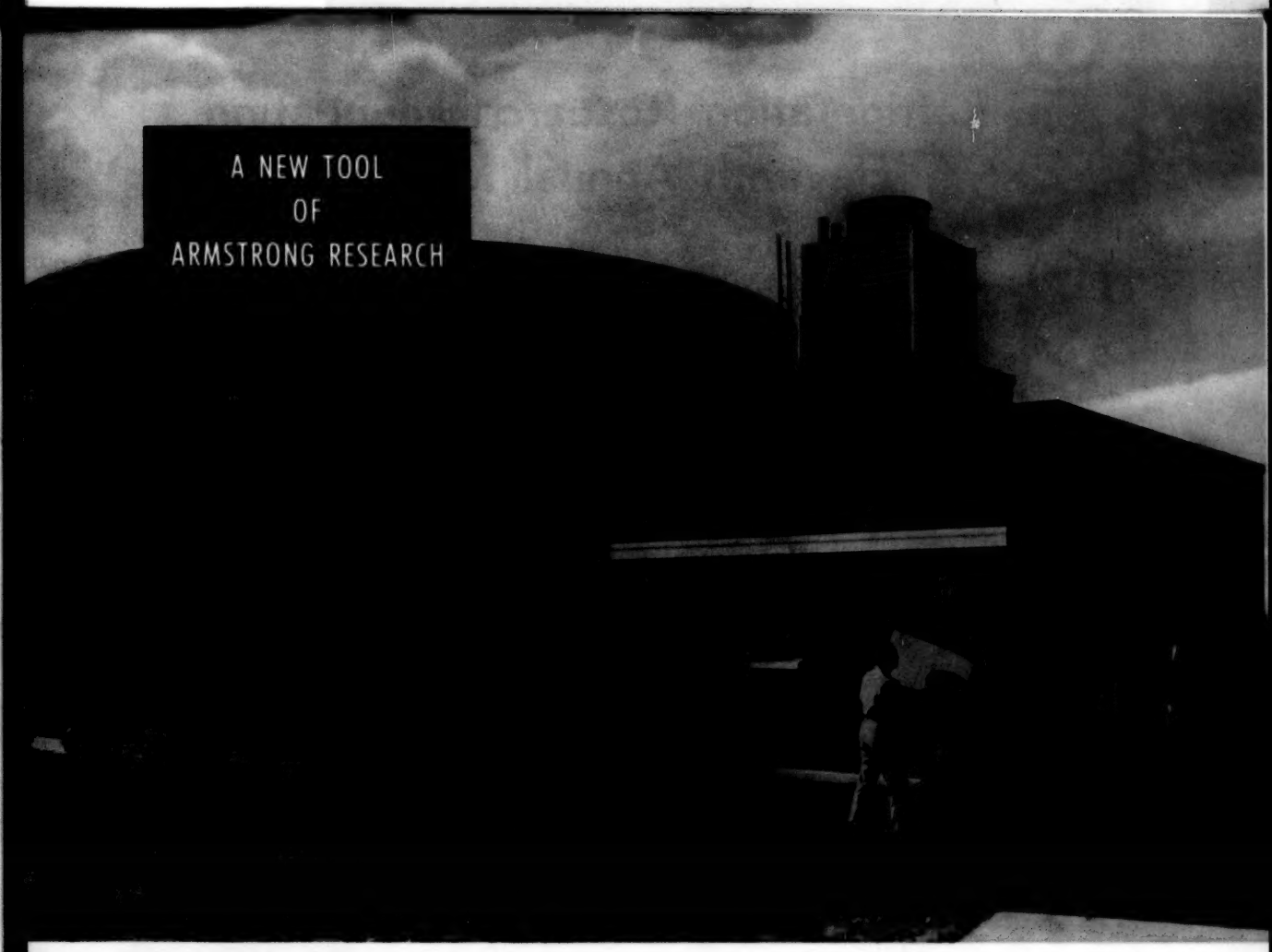
We have cause for concern, he said, in the fact that government control and progressive taxation of confiscatory rates leave little incentive for bold undertakings. We already have discovered that our present high bracket income tax is not as much a tax on the rich as it is a tax on the chances of the poor to become rich. We are running a great risk of quickly becoming a socialistic nation through the back door medium of confiscatory taxation. It is disturbing, he continued, that a large part of our voting population will almost automatically vote for any candidate who promises benefits at public expense.

Closing Session

The closing session was held Saturday, following adjournment of the two Divisions. Routine business was transacted, including a report of the Resolutions Committee, followed by the election and installation of officers.

Canadian Food Chain Opens Warehouse

THE IGA Fresh Foods division has opened a new $400,000 warehouse next door to the Ontario Food Terminal on the Queensway, Toronto, Canada. The two-story brick building is aimed at quick, economical handling of fresh fruits, vegetables and frozen foods. It has a working area of 32,000 square feet, automatic coolers, zero room freezers, tomato and banana rooms.



Test Chamber . . . *unique facilities can duplicate any operating conditions for industrial insulations*

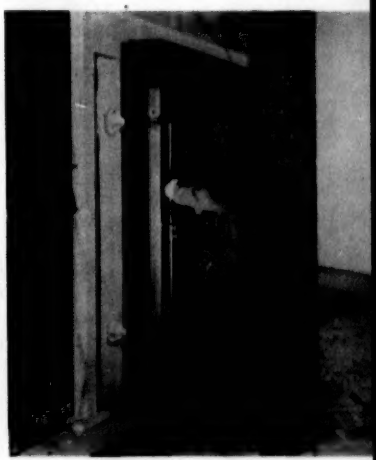
All kinds of insulated constructions can be tested under controlled interior and exterior temperature and humidity conditions in this new Armstrong laboratory building. Almost any service condition can be exactly duplicated.

The large circular chamber can be held at temperatures ranging from 0° to 160° F., with humidities accurately controlled from dry to practically saturated conditions. Complete test rooms are then built inside this controlled chamber and operated at temperatures from 100° below zero to 200° F. This flexible arrangement permits accurate control of conditions on both sides of an insulated wall.

This Armstrong laboratory building is just one tool constantly being used in a continuous program of research . . . a program that is steadily improving insulation materials and techniques used in applying them.

If you would like help in the solution of an insulation problem—or full details on the Armstrong Line of industrial insulations and Contract Service—call your nearest Armstrong office or write Armstrong Cork Company, 207 Stratton Street, Lancaster, Penna.

Armstrong INDUSTRIAL INSULATIONS



To test insulating specifications on various wall constructions, insulations are applied to a test room within the large circular chamber. Temperatures and humidities on both sides of the wall can duplicate almost any set of conditions.

Refrigeration Research Foundation Eleventh Annual Meeting

THE Refrigeration Research Foundation at its eleventh annual membership meeting received reports from the officers and staff members, an informal report from the director, elected new members of the Board of Governors and discussed informally the future work of The Foundation. The meeting was held at the Edgewater Beach Hotel, Chicago, the day before the opening of the annual convention of the National Association of Refrigerated Warehouses.

Harlan Nissen, Los Angeles, Calif. President TRRF

Opening the meeting Dr. S. C. Prescott, chairman of the Board, said that during the year a series of meetings had been held at Columbia University, one of which was on refrigeration at which he had had the honor of presenting a paper on the impact of refrigeration on modern life.

In it he cited the fact that mechanical refrigeration was first recognized as a possibility during the industrial revolution in England in about 1754, but actual accomplishments lagged for several years. In 1865 the first cold storage warehouse was established and in 1868 the first ice cooled refrigerator car was put in service. From these early beginnings he pointed out, the use of refrigeration has constantly expanded, particularly for preserving an increasing list of perishable foods, and air conditioning. One of the significant recent developments has been recognition of the need for research work such as has been carried on so successfully by The Refrigeration Research Foundation.

Wm. A. Sizer, president of the Foundation, commented that having served the Foundation in various capacities since it was organized in 1944, he had kept in touch with its activities and was deeply gratified at the progress it had made in membership and the information it had developed through research. He complimented the Foundation on its substantial financial basis, built up over the years by support of the members and careful management.

Harlan J. Nissen, Vice-president, calling attention to the financial statement, said the amount of money received and spent attested to the strength of the Foundation, and predicted that within the lives of the younger members its stability and usefulness would expand beyond the dreams of the original founders. The Board of Governors and the members could be proud of its present achievements, he added.

Officers for 1955

Chairman of The Board, Dr. Samuel C. Prescott, Cambridge, Mass.
President, Harlan Nissen, Los Angeles, Calif.
Vice-President, Garth Shoemaker, Elmira, N.Y.
Treasurer, Kenneth Stepleton, Chicago, Ill.
Assistant Treasurer, Mack Hunt, Chicago, Ill.
Secretary, H. C. Diehl, Colorado Springs, Colo.
Assistant Secretary, Kenneth Stepleton, Chicago, Ill.

Executive Committee: W. B. Cowan, Winnipeg, Manitoba, Canada, W. A. Kopke, Chicago, Ill., F. D. Newell, Jr., Minneapolis, Minn., H. J. Nissen, Los Angeles, Calif., A. W. Oakley, Jersey City, N.J., G. A. Shoemaker, Elmira, N.Y., K. F. Stepleton, Chicago, Ill., Charles E. Adams, Jersey City, N.J., Fred F. Alford, Dallas, Tex., E. M. Dodds, Kansas City, Mo., Herbert Farnsworth, Boston, Mass., William Giacomazzi, Jr., San Jose, Calif., R. C. Muckerman, St. Louis, Mo., J. W. Straub, New York, N.Y., F. O. Cooke, San Francisco, Calif., Harry Foster, Cincinnati, Ohio, James Kuehn, Milwaukee, Wis., Clyde Simmon, Oklahoma City, Okla., William Sizer, Chicago, Ill., Gilbert Stecker, Louisville, Ky., Horace Wilson, Philadelphia, Pa.

The Director Reports

H. C. Diehl, director, made an informal report on the Foundation's activities, supplementing his annual report which had been distributed in printed form. It's always pleasant duty, he said, to recount these annual accomplishments, some of which may have escaped notice.

The most critical problems facing freezing and refrigeration today, he said, are the targets of research that the Foundation aids and sponsors. One problem he mentioned is the need for exact information on "end points" of temperature damage for all the numerous kinds of frozen foods.

H. C. Diehl, Colorado Springs, Colo. Director, TRRF

This information, Mr. Diehl said, is needed in greater elaboration than we have ever had before, simply because the frozen foods industry is now a major one in size and also in complexity of its products. The early history of the canning industry shows, he said, that several decades were spent by scientists who delved into the basic factors that underlie quality, and the result was eventually sound industrial control of quality and sound growth.

Such information for frozen foods is needed not only by warehousemen, he pointed out, but by all factors from production to consumption, including governmental regulatory bodies who are now considering ordinances and laws that will facilitate inspection of frozen foods in the public interest. While many industrial and research groups are working on

this problem, Mr. Diehl cited one project that is noteworthy for its comprehensiveness and unique equipment for such studies. That project is under way in the Western Utilization Research Branch of USDA with headquarters in Albany, Calif. The Foundation aids and sponsors that project, which seeks quality "end point" knowledge for frozen fruits, vegetables and poultry products.

A major development in Foundation activity, Mr. Diehl said, is extra stress on packaging. There are several good reasons, such as package-failure problems in warehouses, the need for understanding of "Microclimates" that are most appropriate for commodities that are refrigerated or frozen (that is, the atmospheres within the packages), and the apparent relation of packaging to the problem of condensation.

Since the Foundation is basically concerned with storage, its interest in commodities is indeed very broad. Mr. Diehl discussed briefly projects that the Foundation is aiding on frozen concentrated milk, frozen fisheries products, frozen poultry products, fresh citrus fruits, various vegetables and fruits, and certain non-food products such as storage batteries. These have made substantial progress during the past year.

New Products

New project areas that the Foundation expects to develop include meats, floricultural products seeds, transport problems, and others. Some, such as meats, have been the subject of earlier projects, but no project work was done on them during the past year.

Some projects are directly related to refrigerated warehouse operation. These include a project on frost heaving, under way at the University of Minnesota, a project on enthalpies of refrigerated foods at the University of Illinois, one on low-temperature psychrometry in Drexel Institute's Laboratory of Climatology in New Jersey, one on heat-transfer in refrigerated structures measured by the electrical analogue method at Columbia University, one on study of cold-storage atmospheres at Purdue University and others.

The need is recognized, Mr. Diehl emphasized, for training of personnel in warehouses, as well as all along the route for those who handle frozen foods. During its eleven years, the Foundation has conducted a dozen training conferences, each lasting several days, for refrigerated warehouse operating personnel.

Report on Packaging

Wm. J. Hoover, assistant to the director, gave an interesting report on the work on packaging. Better packaging, he said, is important to the producers as well as the warehousemen. The importance of this work had been recognized last year by the appointment of a special committee on the subject and a survey of the membership which had brought very good results.

Out of this had grown the idea of designing packages that will extend the storage life of commodities. This has been accomplished and has resulted in great advantages of monetary value. From the standpoint of the warehouse industry, great advantage, it is expected will result from informing producers how they can save through using packaging that will conform to better practices in the warehouse.

A number of extemperaneous comments were made on the future work of the Foundation. One was a suggestion that the marketing or sales angle be given consideration in the interpretation of research information. Another was that some study be made of outstanding industrial and economic developments such as shifts in population.

Members of the Board of Governors were nominated and elected to fill vacancies of terms expiring in 1958 as follows: Harry Foster, Cincinnati, Ohio; James Kuehn, Milwaukee, Wisc; Horace Wilson, Philadelphia, Pa.; Gilbert Stecker, Louisville, Ky.; Clyd Simmon, Oklahoma City, Okla.; Wm. A. Sizer, Chicago, Ill.; Frederick Cooke, San Francisco, Calif.

The annual dinner meeting of the Board of Governors was held Tuesday evening. Past and future work of the Association was discussed informally and officers for the year were elected.

New Storage Products for Warehouses

JAMES H. KUEHN
Wisconsin Cold Storage Co.
Milwaukee, Wisc.

A SUBJECT of great importance to refrigerated warehouses of today is that of attracting new products for storage. Our company has been interested in this for several years and through experimental study and contacts with prospective customers we have developed a sizable volume of new storage products.

The first thing to be done is to learn why new products are or should be stored. These reasons may be listed as follows: Increased demand from consumers, such as rose bushes; High perishability of product such as cut flowers; Seasonal production, such as processed cheese; Experimentation, such as metal testing; Seasonal demand for product, such as Christmas candies; Leveling of production load.

Another important fact is to know the physical characteristics of your plan; its type of construction, type of refrigerant, humidity conditions and all such that would have a bearing on prospective new products.

Knowing how to find new products for storage requires an awareness of why products are stored, an intimate knowledge of the supply and demand of perishable products used in your own market, and especially knowledge of production peculiar to your locale.

Over all of this there must be an aggressive attitude, keeping in touch with new developments, seeking and finding products that will be benefited in one way or another by storage, and then showing the owner what storage will do for him.

In considering especially the storage of new products, there are certain things that must be known about your plant, its advantages and limitations, feasibility for storing a particular product, the charge to be made, technical or practical advice needed. Frequently on new products, particularly those being tried out on an experimental basis, a very small amount of money is involved, in fact it may be found advantageous to make no charge in order to cultivate a customer. Technical advice may be obtained from The Refrigeration Research Foundation, the local college or university, or possibly from industry.

Among the new products being stored, some of which our company has developed are: moose feed, testing gas engines under low temperature, Penicillin, Pfeffernuesse cookies, blood plasma, mothers' milk, smoke-damaged furs, storing bread for Monday deliveries, plastics, auto batteries, coffee, strawberry plants, cocoa powder.

From talk given at NARW-TRRF Training Conference January 10-13, 1955.

Frozen Food Leaders Discuss Outlook And Marketing Problems

THE closing session of the National Frozen Food Convention in Chicago, March 16, featured an "Executive Board Meeting of the Industry" during which a panel of industrial leaders held a discussion meeting, with the audience listening in and contributing. John M. Fox, president of Minute Maid Corp., acted as chairman of the board. Bradley T. Jones, vice president of Pict-Sweet Foods, acted as counsel to the board and presented a summary of the discussion at the conclusion of the meeting.

Other board members present were: F. M. Bundy, Gorton-Pew Fisheries Corp.; Leo E. Croy, Marathon Corp.; H. F. Krimendahl, Stokely Van Camp, Inc.; J. P. Napier, A. C. Nielsen Co.; Walter S. Shafer, Armour & Co.; Vernon Stouffer, Stouffer Corp.

The discussions were conducted on an "off the record" basis in order to encourage the frankness and informality of expression that would be typical of an actual Board Meeting. Mr. Jones, in his summary restated many of the points covered and drew three main conclusions: (1) that the encouraging factors in the frozen food business far outnumber the problems, (2) that the problems are recognized and are being combatted, and (3) that the industry is looking to the future and is planning its growth on a business-like basis, backed by research.

Population Increase

A population increase to 207 million people by 1970 was forecast. This should be accompanied by a food sales gain from $64 billions annually to $116 billions. Convenience, nutritional value and variety were factors which were seen to support an increase in the frozen food industry's share of food volume from the present 4 to 5 percent to over 10 percent.

Product and market research are now applied to both production and distribution problems. But more research and more merchandising and promotion were seen as the individual processor's best method of obtaining his fighting share of limited cabinet space. With this space too often limited to between 10 and 20 lineal feet, more backroom storage is needed, as is also improved design cabinets, particularly as to vertical display space. A chain store operator from the audience insisted that justification for cabinet placement must be on a net profit basis, not just movement and gross markup. He stated that cabinets cost $100 per lineal foot, as compared to $1 per foot for dry shelf space.

Board members generally foresaw increasing volume, but with several reservations that profits would have to be plowed back into research and merchandising. Recession aspects were discussed, and while it was felt that the frozen food industry was not "recession-proof", it is more able to face such a situation on a competitive basis with other foods than would have been the case in the past. Irradiation preservation had been the subject of research by several of the board members whose present feelings were that current accomplishments in that direction do not pose a competitive threat to the freezing industry at this time.

Concern was voiced over loss of refrigeraion during distribution, both during movement and in stores. All recognized the necessity for a stronger educational job on this area of product protection. It was concluded that the frozen food industry evidences an increasing industrial maturity and the prospects of a favorable future.

Some of the more important points discussed at the meeting are briefed as follows:

Forecast for Sales and Profits

Prospects for fish sticks are tremendous. Their sales are expected to increase a further 30 to 35 percent this year.

Judging by the placement of orders for packaging material by the packers, there should be a big increase in all other frozen food sales this year.

While a gratifying increase is expected in sales, profits are another matter. A low profit record has been characteristic of the food business.

Consumer take-home pay is running 1 percent ahead of last year and this should increase to two to three percent over last year later on. This should translate into a three to five percent increase in food sales overall. Frozen foods will doubtless do much better.

The meat industry is handling more meat than last year but the sale of this product is so susceptible to what's in the pay envelope that it is hard to prognosticate.

What Ceiling Does Limited Cabinet Space Impose on Frozen Food Sales

The ceiling is there, of course, but the low ceiling is for the slow moving product. Distributors are looking for turnover and must have it to make money. The same goes for the retailer. If merchandise doesn't turn, it doesn't belong in the cabinet and it doesn't stay there.

The ceiling is getting even lower, because of a trend towards concentration of shopping at the end of the week. The bulk of a week's business is now done in just 12 shopping hours. You have to have a good product and good packaging to get movement during these 12 hours. There's another trend; men are doing the shopping much more than they used to, possibly because self-service has made shopping easier. I'm not sure what this will mean.

I suspect that the new precooked foods are complicating the space problem for the older items. They've already taken up a good deal of the room and will take more.

There's only one way to lick the space problem, to have a good product, and to promote it aggressively to the consumer. The retailer will find space for it if you've done that.

We'll never have as much space as we want, for one very important reason. It costs us $1 a foot to put in shelving for dry groceries and $100 a foot for zero display cases. The higher markup on frozen foods just about makes up for this difference in costs and maintenance. That's a hurdle that will always be there.

Consumer buying trends

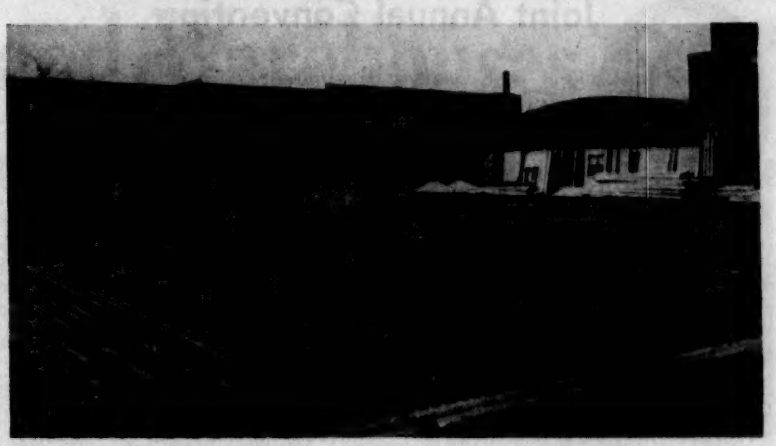
In packages, we know that the consumer wants the following: (1) A picture of the product. (2) Easy-to-understand instructions on the back telling how to prepare it. (Many customers don't know what the word "steam" means). (3) An inventory of the contents, number of pieces, number of servings, net weight. (4) A notation as to whether the contents are precooked, ready to serve, or ready to be cooked.

Above everything else, the consumer wants convenience. We found that out when we went into the frozen food business. Originally, in 1946, when we first started selling carry-out foods, we did only a small business. The customers found it inconvenient to carry the food away. The solution was to package and freeze it. Anything you can do to cut down kitchen time for the modern housewife will earn you customers.

Outdoor Plastic Ice Rink for Chicago Skaters

ONE of the largest outdoor ice rinks with plastic piping is the Michael Kirby Ice Bowl 7400 South Loomis Street, Chicago. It is 100 feet wide and 200 feet long; 20,000 square feet of skating surface.

The rinks incorporate the "Uniflo" system which permits the headers to be frozen directly into the ice skating surface, thereby eliminating all of the necessity of header trenches or boxes. The rinks are a roll-away type which can readily be taken up and laid down.



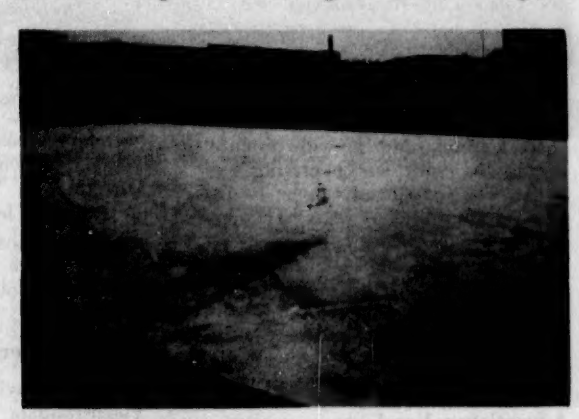
View of Kirby Ice Bowl during construction showing rows of approximately twelve miles of plastic piping.

Protective Fence

A standard hockey-type dasher surrounds the ice skating surface in the ice bowl. This is a smooth 3 ft. 6 in. high fence with curves in each corner to prevent possible accident. One end of the ice bowl, approximately 25 x 100 feet, is fenced off for beginner skaters.

The Michael Kirby ice skating school is becoming a popular type of operation. This section of ice, approximately 2,000 square feet, is roofed over and has dressing rooms for boys and girls. The dressing rooms are equipped with lockers and lavatory facilities. The section also has a seating capacity of approximately 50 people, for those who wish to watch the school in operation.

A closeup view of the plastic piping in place.



Looking across the finished rink to the warming house.

School Teaches Skating

The Kirby school system teaches the appreciation of ice skating which interests all ages, from three to eighty years old. Instruction is available in group or class, or individual instruction. This is the third such school which the Kirby system has installed.

The lighting is handled by ten 25 ft high posts, five located on each longside of the rink. Each pole has a cluster of three 500-watt lights which are adjustable as to direction and each light is controlled individually by the operator in the warming house sound room. One, two, or three lights in each cluster may be used as desired. This lends itself to the use of colored lights which is very effective in ice skating, particularly outdoors.

The sound system consists of three adjustable directional type speakers, located carefully to give the best sound effect. The record player, public address system is all located and controlled along with the lighting from one control room in the warming house.

The warming house is 28 feet wide by 63 feet long and houses men's and women's rooms, check room, skate rental and sharpening room, as well as the food and beverage concessions. The ice bowl has a capacity for approximately 900-1,000 skaters, in addition to the capacity of the skating school.

It is the plan of Mike Kirby and his associates to organize neighborhood skating clubs, both for figures and speed. They also are laying their plans for possible amateur hockey leagues.

Both units of the rink were designed by John A. Heinzelman, and built by Buildice Company, Inc., Chicago, Ill.

Swift Extends Frozen Foods Operation

RECENT acquisition of Holiday Food Co., Kansas City, packers of "Stoaway" frozen foods is announced by Swift & Company. It will operate as Swift's Holiday Foods division, packing meat pies and prepared dinners under both the "Holiday" and "Stoaway" brands.

Indiana And Ohio Ice Associations Hold Joint Annual Convention

THE Indiana and Ohio Associations of Ice Industries held a joint annual convention March 29 and 30 at Dayton, Ohio, following a regional meeting of the National Association of Ice Industries held the day before. A pre-convention welcome party was held at the hotel Sunday evening; Tuesday afternoon the entire group made a bus tour of the Wright-Patterson air base and museum, and Tuesday evening the annual dinner party was held.

The opening session Tuesday morning was devoted to the subject of Vendors which Jack Whitelock, presiding, and president of the Ohio association characterized as the most important subject in the ice industry.

M. L. Ottman, City Products Corp., Cleveland, covered the subject from the standpoint of selectivity, loading, supervision and economies. Selling ice through vendors, he said, is a most effective way of keeping the ice volume up. His company started in this line in 1952 and every year since then has shown increased sales. It takes two or three years for a vendor to reach its peak. The cost of one, he pointed out, is no more than a truck and it will produce more, and with less operating expense. The investment can be recovered in four to five years. The operator cannot depend on highway traffic, but rather upon customers in the neighborhood. This method of merchandising ice is especially advantageous because it meets a need of the industry to make ice available when and where customers want it.

Advertising Vendors

R. L. Miller, Vigo Ice & Cold Storage Company, Terre Haute, Ind., covered the subject of promotion and advertising of vendors. As a basis for an advertising program, he said, he made a thorough study of what the company had to sell and how this would appeal to prospective customers. Much of his ideas, he said, were gained from the employees. His advertising program, necessarily limited by prospective income, was made up of newspaper, TV, radio, house-to-house and direct mail. Vendor locations are printed on the bags and on the trucks, also small cards to fit a wallet, carry the locations. His company operates eight stations, the average gross of which runs from $8,000 to $10,000, and $15,000 for the best vendor.

Business Sessions

Tuesday afternoon, following return of the buses from Wright-Patterson Air Base tour, separate business sessions were held by each Association.

At the Ohio meeting a revision of the by-laws was presented and passed providing that directors could be elected for two years, but not be eligible for re-election for one year.

Condolences to families of deceased members: Earl Humes, Napoleon; Henry Adams, Cincinnati; and George Shepard, first secretary of the Association, Toledo, were presented by Ralph Curtain, Circleville.

Safety awards for the year were presented by Gilbert P. Bush to the Crystal Ice Company, Marietta; Peoples Ice Company, Warren; and City Products Corp., Belleview.

Ohio Officers

New officers and directors were elected as follows:

President, Jack Whitelock, Warren

Vice-President, James S. Boardman, Columbus.

Secretary-Treasurer, Elizabeth Shannon, Steubenville

Directors: A. C. Rosser, Piqua; Bud Ottman, Cleveland.

At the Indiana business meeting, brief committee reports were presented and the following officers were elected.

Indiana Officers

President, David Barnes, Gary

Vice-President, B. H. Landing, Michigan City

Vice-President, Max Weath, Brazil

Treasurer, Charles F. Scheidler, Greensburg

Secretary, Robt. F. Walton, Indianapolis

A resolution was offered and adopted expressing appreciation of the hospitality of the Ohio Association in this first joint convention, and suggesting that the Indiana Association may be able to reciprocate at some future time.

Sweet Corn and Channel Icing

The closing session Wednesday morning, David Barnes, president-elect of the Indiana Association, presiding, covered iced sweet corn and channel icing.

An interesting story of sweet corn icing was told by Vernon Weingart, Kent, Ohio who with his father and two brothers grow and market 200 acres of sweet corn. They have been in this business for three years, using wet strength paper bags holding four or five dozen ears with 20 pounds of ice. They truck ice from an ice plant at Warren, Ohio, store it in a specially built ice storage house and crush it as needed. At first, using all hand labor, the labor cost ran pretty high. So they designed and built bagging equipment which has worked very satisfactorily.

Channel icing was covered in a forum discussion conducted by Ed Mockler, Index Coupon & Supply Company, LaPorte, Indiana. It was brought out that this method of merchandising fresh vegetables in stores is more and more finding favor with the larger stores. One of its advantages is that various methods may be used to meet individual needs. An adverse comment was offered that too many grocers expect the iceman to prepare the display, and will not take the time to do it themselves. The only way to meet this, it was suggested, was to make the groceryman understand that it will pay him to do this for the sake of increased sales.

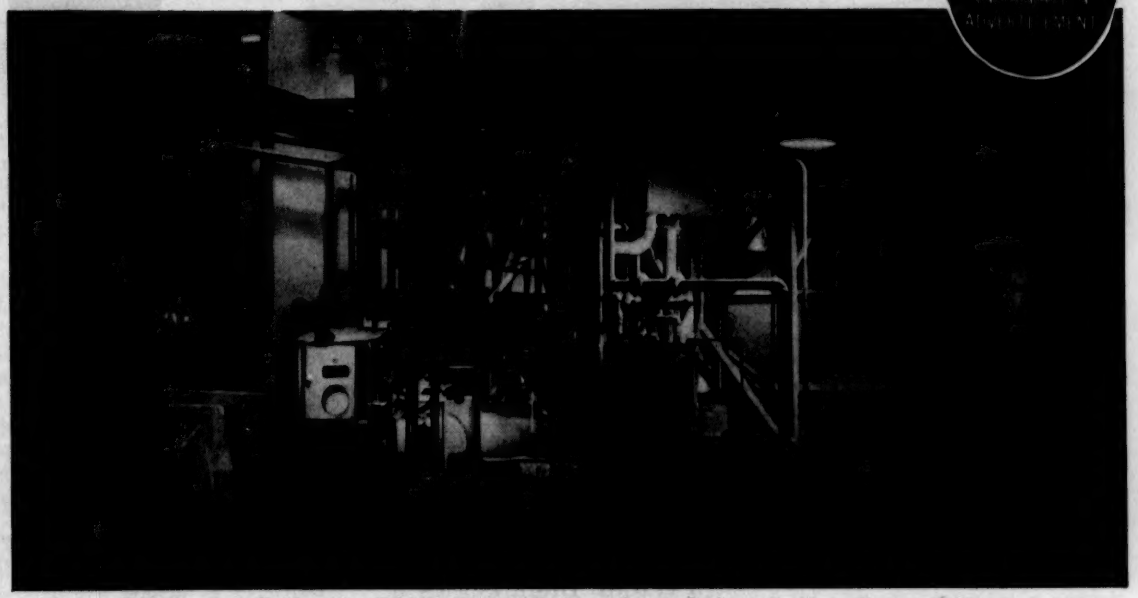
Markets For Ice

C. P. Austin of the National Association of Ice Industries laid down a challenge to the ice industry to make use of the markets for ice that have recently been opened. Sweet corn icing, for instance, uses a considerable volume of ice, and this market was opened up only a few years ago in Ohio and Indiana. While the industry could use some big new market for ice, it does have a multitude of such markets as sweet corn icing, channel icing, meat and poultry icing, processed ice, and many others the aggregate of which will result in volume comparing very favorably to one big new market. But the ice man cannot expect customers to ask for this service without some promotion on his part. Not all of these will work in all markets, he added, but all ice men can find valuable outlets in many of them.

Guy W. Jacobs, executive secretary of the National Association of Ice Industries, reviewed briefly the accomplishments of the two associations and of the National Association. He called attention to the National Ice Convention to be held in Los Angeles in November and said it offers ice men an opportunity for an interesting trip and promised an interesting and valuable program as well as top entertainment.

NEW facts for your files on York Ammonia Rotary Booster Compressors for

Frozen Food Warehouses



York Ammonia Refrigeration Equipment at the Exchange Lemon Products Company, Corona, California, includes 7 high-speed York V/W Compressors and 3 York Rotary Booster Compressors. This compound compression system totals approximately 100 tons refrigeration at –30°F. suction temperature. Four levels of ammonia pressures are maintained for the various cooling and freezing loads: east storage room at –10°, S.W. storage room at 35°, N.W. storage room at 20°, and freezing tunnel at –40°. Contents of this warehouse would fill a freight train more than 3 miles long.

TEMPERATURES GOING DOWN—and compound compression systems meet lower temperature requirements most economically. York Rotary Booster Compressors are designed for this type of system.

LOAD GOING UP—equipment must deliver more cooling for the space it takes up. York Rotary Booster Compressors provide high capacity in small amount of space.

GREATER LOW-TEMPERATURE ECONOMY WITH COMPOUND COMPRESSION SYSTEMS—and York Rotary Booster Compressors add to economy, always start unloaded to reduce starting power requirements.

OPTIONAL POWER SUPPLY—York Rotary Booster Compressor speeds allow direct connection to, or V-belt drive by, A.C. or D.C. motors and, in some cases, to internal combustion engines.

EASY INSTALLATION—because York Rotary Booster Compressors' compact size and purely rotating motion make much lighter foundations possible. Floor space and headroom, too, are kept to a minimum.

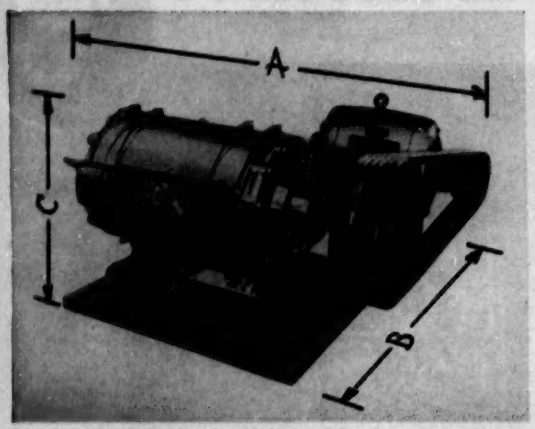
ENGINEERING SERVICE—York's vast experience in the freezing and storage of foods is part of a complete York service available to your design engineer.

Some Helpful Hints for Warehousemen

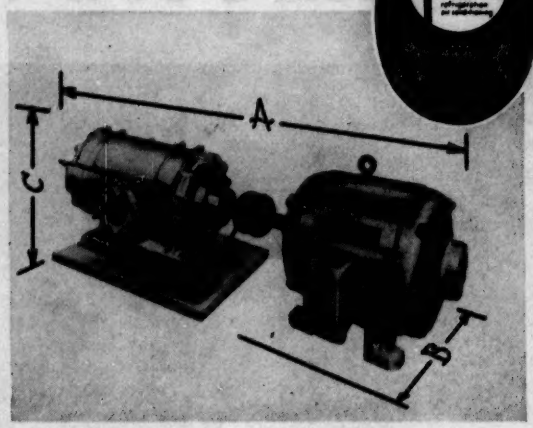
1. To reduce the amount of air transmission between cold rooms and outside areas, install a double set of doors that create an air lock between the two areas. Also, when possible, have only one door leading into a cold storage area open at a time, since this will lessen drafts.
2. Electric heating coils, installed on jambs, heads and bases of cold storage doors, will prevent them from freezing in place.
3. Install bumper posts several feet out from the hinged end of the cold storage doors. Properly installed, these will "channel" fork lift trucks entering the cold storage areas and prevent them from entering at an angle that could damage the doors. It will also improve the flow of traffic in and out of the cold storage area.

CUT ALONG THIS LINE AND FILE

YORK AMMONIA ROTARY BOOSTER COMPRESSORS



Model 23C, showing belt drive and base



Model 5CCA, showing direct drive and base

York Rotary Booster Compressors bring important advantages to cold storage warehouses. In compound compression systems, for example, York Rotaries provide efficient and economical operation where evaporator pressures are extremely low. Their volumetric efficiency, under such cases, equals or exceeds that of the reciprocating-type compressor.

TYPICAL DIMENSIONS

V-BELT DRIVE	DIRECT DRIVE
(A) including motor and depending on model chosen 28"–83"	(A) including motor and depending on model chosen 55"–132"
(B) 75"–163"	(B) 29"–111"
(C) 34"–62"	(C) 22"–62"

PRINCIPAL FEATURES

EASY STARTING—Rotary compressor pumping does not begin until centrifugal force causes the blades to move outward to the cylinder wall. Thus, starts are always made from an unloaded position, with only the inertia of the rotor to overcome.

EASY MAINTENANCE—All wearable parts in York Rotary Booster Compressors are easily removed and replaced when worn.

EASY INSTALLATION—Compact size, light weight and vibration-free operation of York Rotary Booster Compressors minimize space requirements and permit easy installation.

OPERATION—York Rotary Booster Compressors consist essentially of a water-jacketed casing or cylinder within which is an eccentrically mounted rotor of smaller diameter. Blades or vanes ride in slots milled into the rotor. The blades are forced to the cylinder wall by centrifugal force. Gas is drawn into the compressor between a pair of these blades; and, as the rotor turns, the blades are forced back into their slots by the cylinder walls, and the gas is compressed.

SPECIFICATIONS—STANDARD UNIT

CAPACITY—from a few tons to 350 tons refrigeration capacity in a single unit.

ROTOR—Special high-tensile strength iron alloy in sizes up to 13. From 13 and above, the rotor and shaft are machined from a single steel forging.

BLADES OR SLIDING VANES—Durable Phenolite, a laminated asbestos impregnated with phenolic resin and heat treated.

SEAL—A spring loaded double seal assembly composed of two cast iron collars and two stationary carbon rings.

LUBRICATION—Mechanical lubricator furnished with each compressor. Individual feed to each lubrication point.

DRIVE—Models 5CCA, 5CCB and 27D may be direct connected only. All other models are available for either direct connection or V-belt drive, dependent upon motor horsepower.

YORK CORPORATION

the quality name in refrigeration

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

CUT ALONG THIS LINE AND FILE

National Ice Association Brings Newer Merchandising to Members

THE second of a series of regional meetings of the National Association of Ice Industries was held in connection with the joint annual convention of the Ohio and Indiana Associations of Ice Industries at Dayton, Ohio, March 28-30. In an all-day session, Monday, March 28, the meeting was directed by Leonard Swartz, Indianapolis, assisted by Guy W. Jacobs, executive secretary and C. P. Austin, director of Engineering Research and Marketing, National Association of Ice Industries.

The meeting was called, Mr. Swartz explained, to bring the members up to date on the newer merchandising ideas, by telling what the more successful ice companies were doing. It was strictly a practical program, each subject presented first by slides, accompanied by a commentary by Mr. Austin and followed by comments and questions from the audience.

Processed Ice

The subject of processed ice was presented first which, as explained by Mr. Swartz, seemed to be of most interest to the public. This covered detailed process of making both sized and cube ice, delivering to vendors and other means of selling. The discussion brought out that with a sizeable volume the use of modern equipment made it possible to reduce costs, making it a very profitable phase of the ice business. It was suggested that the plans used by the more successful dealers could be adapted by others, even for small operations.

Slides on refrigerated and non-refrigerated storage boxes showed how ice is being made available at filling stations, country groceries and other locations where the volume would not justify a vending station.

Selling ice in retail stores was reported a very successful project. The usual procedure is to provide the store with a refrigerated cabinet such as a home freezer for crushed ice and ice cubes. Some reported that such sales had adversely affected nearby vendors and others reported no such effect.

Hydro-cooling, it was stated, had been known and used for several years but recently more interest has been shown, especially in peach growing sections. It is used also for other fruits such as pears, and for vegetables such as cauliflower, asparagus and other perishables. Canners are using the process to retain high quality in their produce before canning. This it was pointed out was excellent business during short seasons.

Poultry icing is used primarily to remove the body heat from dressed birds, but also for displaying the dressed product on a bed of crushed ice. A by-product of cooling freshly dressed birds with this method is that they tend to absorb water and too much of this will cause a deterioration of the quality.

Truck Icing

Truck icing on routes of trucks hauling perishables is a very lucrative business where the volume is large enough to justify rather elaborate equipment. Slides of a number of these were shown. It was pointed out however that when the demand was not large, home-made equipment has been devised by a number of companies with very good results. Credit cards issued to drivers of the larger trucking companies have been very satisfactory.

Punch bowls and ice carvings offer a very good market for quality ice, for which people are willing to pay good prices.

In regard to standard colors, many ice companies have gone in for painting pipes, controls, and other mechanical equipment in uniform colors as a means of safety and to make it easy for the operating personnel to identify those parts.

The subject of sanitation was covered by a series of slides showing, in the main, the importance of good housekeeping, as well as cleanliness. While most contamination comes after the ice has been delivered, this does not relieve the ice plant of maintaining at all times the utmost precautions to produce a sanitary product.

The slides on vendors presented a considerable variety, from large to small installations, and also different mechanical processes. In this connection it was announced that a meeting of vendor manufacturers will be held soon with the Engineering and Research Committee to consider needed improvements, and this brought a considerable number of suggestions. Along with adverse comments however it was stated that the vendor is filling a very worth while place in the industry.

Among the methods of delivering ice to vendors are small pallets on hand trucks, also a large basket such as used in locker plants in which packages of crushed ice or cubes are packed for transportation to the vendor. For long hauls, for the most part, insulated trucks are used.

On the subject of refrigerator car icing, some of the more elaborate equipment was shown, including Preco and Link Belt, also the icing dock designed and built by The National Ice & Cold Storage Company of California.

A number of novel uses of ice were illustrated and described. Among these were a big ice bowl filed with punch for a new store opening. In Louisiana a neighborhood bank bought several tons of ice, crushed to imitate snow and sprayed on a front lawn as Christmas decorations. Another Louisiana store, to celebrate its opening, had several items of vegetables frozen in large cakes of ice.

A number of signs were shown, chiefly pointing to ice plant or vending station as a service to tourists. More of these signs are needed, it was stated. The Indiana Association is working on such a project on a cooperative basis. Among other illustrations was a float representing a big cake of ice.

Illustrating meat-on-ice a number of views were shown of fresh meats displayed on crushed ice, also of dressed poultry. Although meat-on-ice initially caught the favor of meat retailers in many cities, there has been a decrease in interest. This is of more value to fresh meat than to packaged meats, it was stated.

Automatic Controls

Automatic controls were shown and described briefly. Such controls, it was stated, are valuable as a means of saving on operating costs and also from the standpoint of safety.

Closing the session Mr. Swartz said that the ice business of today, with its enlarged market, offers a better business opportunity than ever before, especially to the younger men. He contrasted the present with conditions of 30-35 years ago when the inroads of mechanical refrigeration made it essential for the ice industry to exert a big effort to save itself. That same amount of effort today, he said, will produce better and more lasting results.

During April similar regional conferences were held at Portland, Oregon, April 15; Wichita, Kansas, April 20; Denver, Colo., April 22; and Old Point Comfort, Va., April 29. Previously, the first of the series of 14 conferences was held at Durham, N.C., March 8.

HOWE COMPRESSOR INSTALLATION showing 4 models 9-20-6½", 2 models 9B-20-6½" Boosters, and 1 model 9-15-5½".

NEW 1955 IMPROVED

HOWE

REFRIGERATION

EQUIPMENT

WE ARE PROUD of the compressors we have built that you are now using. Untiring field research and diligent application of these findings have constantly improved HOWE equipment. Today's modern units are finer in construction, more efficient in operation, and provide the same trouble-free service that Howe machines have given for 43 years.

MODERN COOLING SURFACE UNITS include the Rapid Freeze Coolers for low temperature work, and the Polar Circle Coils for normal temperature coolers.

These give maximum results with minimum first cost and low maintenance costs.

Every Howe product is correctly engineered for its exact application. Please consult us on your refrigeration projects.

RAPID FREEZE UNIT COOLER

POLAR CIRCLE COILS

Write for Literature

HOWE ICE MACHINE CO.

Distributors in Principal Cities • Cable Address: HIMCO, Chicago

2829 Montrose Ave. • Chicago 12, Illinois

SINCE 1912, manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment. Immediate delivery!

City Products Corp. Annual Report

IN releasing the City Product Corporation's annual report to the shareholders March 17, William J. Sinek, president, stated it is the sixty-first annual report and 1954 was another year in which the Corporation maintained its unbroken record of dividend payments extending back to 1894. He further stated a dividend of 62½ cents per share was declared payable March 31, 1955.

Nineteen hundred and fifty-four was a year of expansion and progress especially in the national resources and railroad car icing divisions of the Corporation. Decline in sales volume was caused, in part, by the sale early in 1954 of a sheet metal jobbing plant which normally had a sales volume exceeding $2,000,000 annually. During 1954 the Corporation expended approximately $3,500,000, most of which was for requirements in connection with the Corporation's long term railroad car icing contracts.

Net sales for 1954 amounted to $80,764,161 as compared with $84,315,677 for 1953. Net profit for 1954 was $3,538,445, equal to $2.82 per common share, after providing for federal income taxes of $3,855,000 and depreciation, depletion and amortization in the amount of $3,480,849, as compared with a net profit of $3,804,622, equal to $3.04 per common share in 1953. Taxes for the year 1954 totaled $5,899,558 which amounts to $4.70 per share. Earned surplus was $21,618,969 at the year end. Cash balances and Government securities at December 31, 1954 amounted to $11,946,606 and in addition thereto, the Corporation had on hand $2,009,320 of United States Certificates of Indebtedness to provide, in part for federal income taxes on 1954 earnings. Net working capital at the year end amounted to $15,551,135.

Property and equipment of the Corporation are maintained in excellent condition. Maintenance and repairs in 1954 amounted to $3,800,000.

Plans are now being formulated for the continuance of the Corporation's aggressive diversification program throughout 1955.

Marketing Study on Frozen Foods

A PLAN aimed at persuading supermarkets to increase the number of frozen food products they handle has been advanced by Paul M. Jacobs, vice president of Gorton-Pew Fisheries, Ltd., Gloucester, Mass. Gorton-Pew is one of the leading producers of fish sticks. Such items were produced by the industry at the rate of 100,000 pounds a month in 1953 and are now being turned out at the rate of more than 1,000,000 every thirty days.

Briefly, Mr. Jacobs' plan calls for a study by frozen food processors, in conjunction with supermarket operators to ascertain the cost of running a frozen food department and how profits from such a department compares with others. It is also proposed to develop a multi-level frozen food cabinet to add space for frozen products without encroaching on the space of other departments.

Speaking at a luncheon sponsored by the Eastern Frosted Foods Association, Mr. Jacobs warned that the quality of frozen foods must be kept up; that they must fill the needs of consumers at a fair price; that they must be profitable for growers; and that they must be well merchandised.

Quality is more important than price, he maintained. He chided those processors who put out an eight-ounce package with facing the same as the ten-ounce, packaged and designed primarily to fool the public.

keep liquid at its

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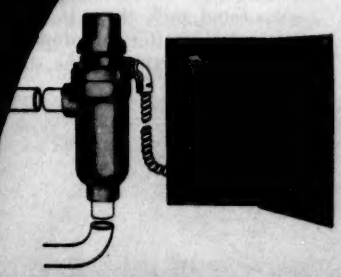

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Refrigeration in the Dairy Industry

EARL E. BERGSTROM

REFRIGERATION is among the most important utilities required in dairy industry processes. It also provides the vital facility for storage over extended time and is essential to preservation of the rich natural flavors of the products.

Applications of refrigeration in the modern dairy plant are as varied as the products of the industry itself. High and low pressure refrigerants, indirect and direct expansion systems, reciprocating and rotary compressors, high and low temperatures, minimums and maximums controls, new and old processes, are involved; and the plant engineers are responsible to a great degree for satisfactory and economical performance of the mechanical equipment.

No food product requires more care in handling and marketing than milk. It must be properly protected from bacteria growth from the time it is taken from the cow until it is consumed. Although the requirements vary, the bacteria count is the basis for grading all milk. This count is specified for the raw product as well as the pasteurized product. Therefore, it becomes imperative that the bacteria growth be controlled within the specified limits of the grade being processed.

Fresh milk which is cooled to 50 F within three or four hours after milking and then stored at temperatures between 35 to 40 F, will not increase appreciably in bacteria content during the first twelve hours. Experiments have demonstrated that milk stored for twenty-four hours at 50 F multiplied in bacteria count only five times. In other samples, the same supply stored for twenty-four hours at 70 F, the bacteria count multiplied 750 times.

Milk Under Refrigeration From Cow to Consumer

Smaller producers who ship Grade "A" milk in cans generally have open chilled water tanks for cooling milk in the can by partial immersion. Some larger producers cool the milk over surface type coolers, storing the precooled milk in refrigerated tanks. Others cool the product directly in the newer refrigerated storage tanks. These (Fig. 1) vary in size from two hundred to one thousand gallon capacities.

Milk is generally hauled to dairy plants in insulated trucks; the tank type in case the milk is picked up from storage tanks, or vans if it is picked up in cans. When precooled at the farm, milk from the tanker truck is pumped directly into refrigerated storage tanks in the plant. To offset cases of unforeseen delay where the product picks up heat in transit from the farm to the plant, receiving plants are usually designed to cool all the product pefore it is placed in storage. This is done with a plate type heat exchanger or a surface type cooler.

Pasteurized product is often again cooled as part of its processing ing schedule (cover) before it is placed in the container and, thereafter, it is stored in refrigerated rooms prior to delivery. In some later plant installations, the product is loaded directly into delivery trucks from the filler, thus minimizing the requirement for refrigerated product storage rooms (Fig. 3). With evaporated milk there is no further refrigeration after the product leaves the cooling section of the sterilizers.

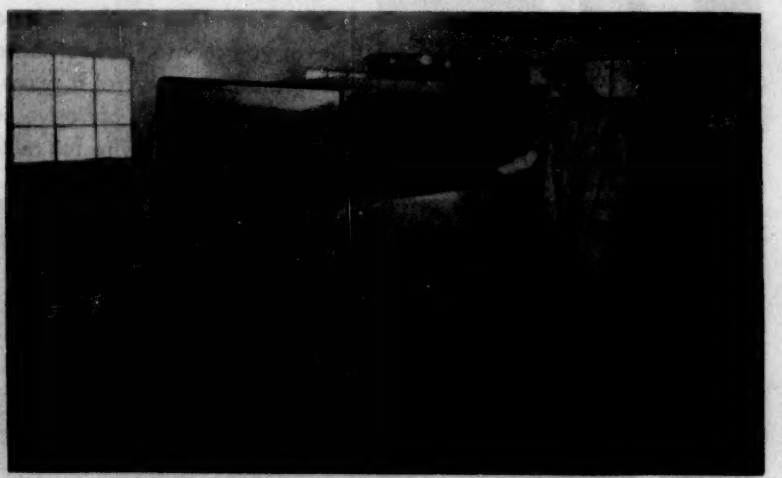

Fig. 1 — Early version of "icy-hold" farm tank, as used for milk cooling on the farm or ranch. Owner cleans tank prior to milking time. Later models are waist-high.—Courtesy of Cherry-Burrell Corp.

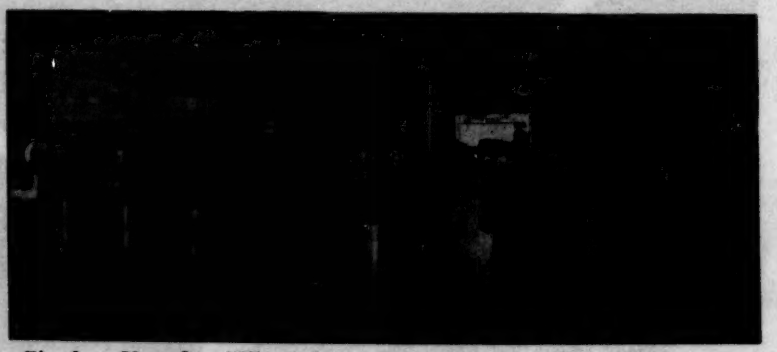

Fig. 2 — Vogt Star "King"-size ice cream freezers similar to these are used in the Carnation Co. plant, Seattle, as described here. Pictured are 3 each VS 400 and VS 200, rated at 400 and 200 gal. maximum capacities each (100% overrun). Carnation is installing total of eight.—Courtesy of Cherry-Burrell Corp.

Now Chief Engineer, Dairy Division, Preston Construction Co. Div., Safeway Stores, Inc., San Francisco, Earl E. Bergstrom had been in a similar position with the Carnation Co. at Los Angeles. His paper was given before California Chapter No. 2, NAPRE, Los Angeles, where he was an active member.

Low Pressure Refrigerating Truck Units Preferred

Delivery trucks are generally insulated. Some are refrigerated with either the individual unit type "Freon" installations, or make and break connections for "Freon" or ammonia systems. All ice cream trucks contain refrigeration systems because of the low temperatures required. The Carnation Company has made interesting studies of the merits of the ammonia system as against the use of the halogenated systems for both ice cream and milk delivery trucks, and has made recommendations for each usage. Although the firm has all types of truck refrigeration systems installed in its numerous operations, studies indicate preference for the individual unit "Freon" or "Genetron" system. Accordingly, wherever possible, our new plant design incorporates facilities for such operation.

From the foregoing, it can be seen that refrigeration plays a very important role in the overall picture of processing a container of milk or milk by-products. Because of Carnation's varied activities, and the fact that the company has been prominent in the production of dairy products for more than fifty years, all types of refrigeration systems and equipment are installed in the various plants; and, the growth and development of the refrigeration industry has been one of the necessary interests of the company.

In the Evaporated Division and General Milk Company (a foreign subsidiary of Carnation), the company has refrigeration systems installed in all major plants, as well as the smallest receiving stations. Most of these installations are simple systems, used principally for cooling incoming raw milk before storage in tanks and cooling evaporated milk prior to storage awaiting can filling operations.

Indirect Sweet Water Systems Gain Favor

Both direct and indirect refrigeration systems installed in Carnation plants have proven satisfactory. In recent years, the indirect method of refrigeration has gained prominence. This method consists of cooling water by direct expansion refrigeration, and then circulating the chilled water through the various process cooling units. From a sanitation standpoint this method has gained preference because the circulated water is generally treated and contains no impurities. If leaks were to occur there would be no loss of entire product due to contamination.

Temperature Control

Temperature control for most of the company's refrigeration system is by means of suction pressure regulators and compressors are usually operated manually, being turned off and on as required. Most of the compressors installed in these plants are the slow speed VSA type with condensers, evaporators, etc. of conventional design.

However, in recent years, the firm has constructed plants in the United States (as well as in its foreign operations) in which it has installed new type high speed compressors along with all the latest process equipment and with which it has employed use of latest operational and protective controls. In anhydrous fat and dried milk operations the Company installs all of the latest refrigeration equipment, including rotary boosters, automatic high and low temperature controls, automatic defrost, etc.

(Continued on page 36)

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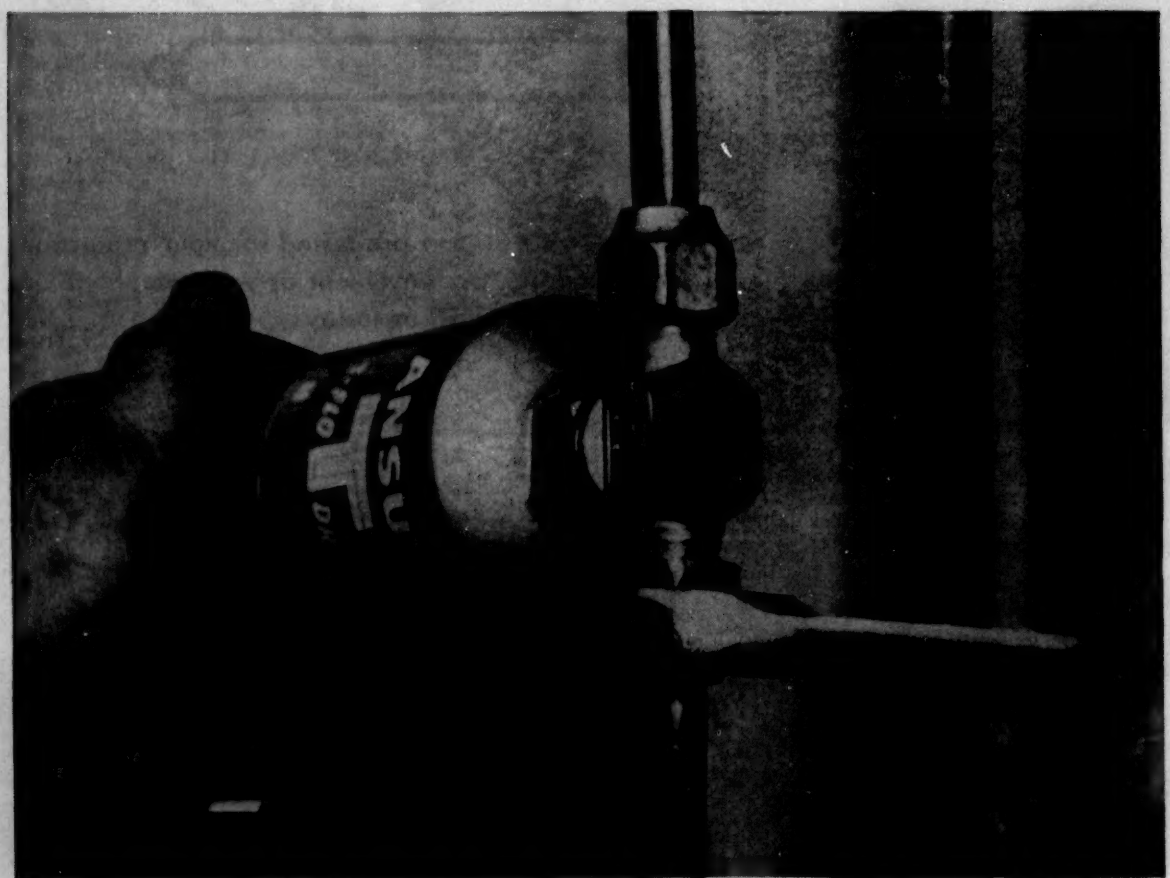
Ansul Dry-Eye if the refrigerant

Now for the first time you have a permanent working tool that shows wetness or dryness at a glance... controls moisture, removes acid.



Here is the new Ansul Dry-Eye System being permanently installed in a refrigeration line. The *pink* color in the Dry-Eye Connector window will change to *blue* when the T-Flo Dry-Eye Cartridge removes the excessive moisture. Once the Dry-Eye System is installed you can replace the Cartridge without breaking the line.

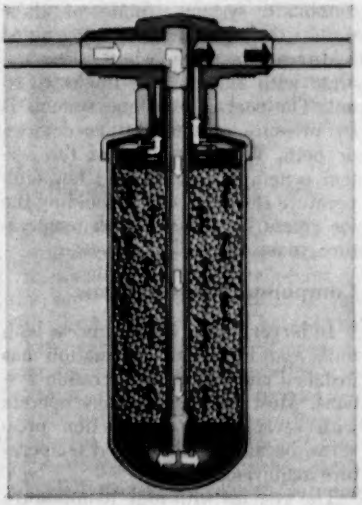
System tells you is wet or dry!

the Dry-Eye Connector window shows changes from pink to blue

No more guessing—now you can know scientifically if the refrigerant is *wet* or *dry*. If the Dry-Eye Connector window shows *blue*, the equipment is in a safe operating condition. If the window shows *pink*, excessive moisture is present—a scientific sign that it's time to take action. To remove the moisture simply change the T-Flo Dry-Eye Cartridge. That's all there is to it. By taking the guesswork out of refrigeration servicing the Dry-Eye Connector cuts callbacks, helps you do a better, more profitable job. It can build new business for you, too, by building your reputation for quality work.

The glass window in the Dry-Eye Connector is guaranteed leakproof at maximum operating pressures.

T-Flo Dry-Eye Cartridge controls moisture, removes acid



A drier should do both for you—*dry deeply* and *remove acid*. Andrite, the drying agent used in the T-Flo Dry-Eye Cartridge, is superior to all other popular desiccants in the deep drying range. This is the range which determines the quantity of desiccant to be used. As for acid removal, Andrite will pick up 4.5% its weight in acid when completely saturated with water.

Performance like this means you can provide better service at a lower operating cost. The extraordinary drying capacity of the T-Flo Dry-Eye Cartridge allows you, in many cases, to install smaller driers than the ones you are now using. Replacement is faster and easier, too, because the T-Flo Dry-Eye Cartridge screws in place like a light bulb—line breaking is not necessary.

Test-try the Ansul Dry-Eye System on one of your "problem" units. See if it doesn't make servicing easier, more profitable. Contact your local Ansul wholesaler for a supply of the Dry-Eye System.

ANSUL CHEMICAL COMPANY, Dept. D-61 Refrigeration Division, Marinette, Wisconsin.

Install the DRY-EYE SYSTEM on old and new units

ANSUL

Fig. 3 — Typical modern dairy delivery practice which concerns refrigerated storage space is loading of retail trucks directly from bottling operations. Electric self-contained refrigeration unit in each insulated truck holds product below 40 F all night. Each unit connects to electrical source carried on poles around perimeter of parking lot.—Courtesy Dole Refrigerating Co.

(Continued from page 33)

Milk and Ice Cream Operations Largest Refrigeration Loads

Fresh Milk and Ice Cream Division has the greatest requirement for refrigeration. This demand is not limited to the process plant, alone. Relay stations for pickup and distribution employ the use of entirely automatic systems. Some of these units use fluorinated or halogenated hydro-carbon gases, while others operate with ammonia as the refrigerant. The control for these systems is by pressure or temperature devices, or both. Work required of the system generally consists of a low temperature storage room for holding the ice cream lines and a high temperature room for milk products.

Compound Plant Systems

In larger plants which process both milk and ice cream, Carnation has installed compound refrigeration systems. Most of these systems operate with several different suction pressures, because of the varied temperature requirements.

The systems with high temperature suction, approximately 35 to 45 psig, are designed to provide proper temperature for chilled water systems, milk processing equipment, milk product storage rooms, and the ice cream mix production equipment and its storage facilities. In some plants this suction temperature is utilized for combination intercooler and liquid precooling operations. Medium temperature suctions, approximately 15 to 25 psig, are employed in connection with ice making equipment and milk filling operations. In a few cases this suction at 25 psig is used for combination intercooler and liquid precooler operations, as well as milk and ice cream mix operations mentioned.

Low temperature suction systems approximately 10 in. (vacuum) to 0 psig, are designed to obtain temperatures for ice cream and novelty freezing, and all such confection storage and hardening facilities. When sharp freezing tunnels are installed, the company generally uses the so-called low-temperature suction for intercooler operation with tunnel booster compressor. In these cases higher suction pressures of the range specified above are used and ice making operations are tied in. The sharp freeze suction system, approximately 20 in. (vacuum) is designed specifically for the sharp freezing tunnels. Most installations only process package products in the tunnels and Carnation limits its installations to such an operation. (See Fig. 2)

In most of these systems the company has employed the use of booster compressors, combination intercoolers and liquid precoolers, suction traps, liquid traps, liquid pumps, oil drain and return systems, special defrost equipment and systems, automatic purge systems, all types of temperature control and control equipment, chilled water systems and their associated equipment, etc. See typical schematic layout, pages 38 and 39.

Production Air Conditioning

Much research has been done toward establishing specific comfort conditions from which different industries may expect the most in production by their employees. As a result, the application of air conditioning to production plants of this company has become more and more prominent. In packaging rooms for malted milk and dried milk products, air conditioning is a necessity because the products are extremely hydroscopic and humidity must be controlled within specified limits.

Although this firm's installations of air conditioning systems have been quite limited, space has been provided in newer plants for this equipment. These systems may use cold water, or either direct or indirect refrigeration systems, for cooling the air. Most of the systems to date have been designed for the use of "Freon" or "Genetron" as the refrigerant. Where advantageous, some use is made of unrefrigerated cold water supply or cooling tower water, with provisions in the systems for addition of refrigeration sections.

Cities Considerations For New Compressor Selection

As previously mentioned, most company installations are equipped with two-cylinder VSA compressors with either V-belt or synchronous motor drive, but newer installations are being equipped with high speed multi-cylinder machines and rotary type compressors. In selecting the compressors for new plants, replacements, and additional machines for existing operations, the matter of repair parts has received top consideration. When compressors are of the same size and by the same manufacturer, spare parts for stock are reduced to a minimum. This is one of the greatest advantages of the high speed VMC machines. Even though the compressors may be a 4, 8, 12, or 16 cylinder unit, all blocks, pistons, cylinder inserts, etc. are standard as to size and can be installed on any unit.

From a standpoint of maintenance and long life, a slow speed machine is preferable to a high speed compressor. Also a compressor operating 12 to 16 hours will last longer than a unit operating 23 to 24 hours per day. In other words, large, slow speed compressors will last longer operating intermittently, and require less maintenance than small high speed compressors of the same capacity.

In recent years, due to savings in the first costs of the compressor, less floor space required for installation, the comparative ease of repair and maintenance, and the greater efficiency of operation, it has been the opinion of Carnation's engineers that these advantages more than make up

any advantages the slow speed machine may have had over the high speed unit.

Machine Efficiency Compared

Company engineers made an interesting comparison between the efficiencies of two cylinder VSA machines and multi-cylinder V/W units operating as single stage compression and also as booster compressors. These machines are manufactured by a leading supplier of equipment. Capacities and horsepower requirements were taken from the manufacturer's engineering manual. Also compared were rotary booster efficiency against VSA and V/W compressors in booster service.

It was noted that under the condition of 90 F condensing and 20 F suction, the V/W machine was 1.26 percent more efficient than the VSA machine at approximately 30 tons of refrigeration; and 3.25 percent more efficient at approximately 120 tons of refrigeration. It was assumed from this and other data collected, that the efficiency of V/W machines over VSA compressors increases as the capacities increase.

Comparing compressors on booster operation, using minus 30 F suction 20 F intermediate pressure, it was determined that at 15 tons of refrigeration the V/W was 1.66 percent more efficient that the VSA unit. The rotary was 1.91 percent less efficient than the VSA machine, and 3.65 percent less efficient than the V/W unit under these same conditions. However at 70 tons refrigeration the V/W machines were 40 percent less efficient than the VSA; the rotary 1.70 percent more efficient than the VSA and 2.08 percent more efficient than the V/W machines. From this it was assumed that the V/W machine is superior to both other types at low capacities, and about equal with VSA units at higher capacities; and that the rotary is superior to both the other types at the higher capacities.

Condensing Practices

The condenser is a very important unit in the dairy refrigeration system, and in most cases as in other industries receives less attention than it actually deserves. Most Carnation installations are water cooled or evaporative types except for the smaller "Freon" systems which are air cooled. Preference in recent years has been toward the evaporative unit.

In localities of adequate water supply where the problem of waste water disposal has not been a consideration, the company has installed double pipe or shell-and-tube type condensers; the double pipe affairs in the older plants, of course. Main objections to double pipe condensers is the area required for installation, excessive cost of maintenance, and loss of refrigerant charge through leaks, etc. The great number of fittings and packing seals contribute to the leak problem.

Heat transfer coefficient in Btu/sq ft/hr/F for double pipe condensers varies from 250 Btu with a water velocity of approximately 180 ft/min to about 370 Btu with water of 360 ft/min. Shell and tube condensers coefficient varies from approximately 225 Btu with water at 180 ft/min, to about 450 Btu with a water velocity of approximately 360 ft/min, or about 80 Btus more than double pipe units at the higher velocity. It was generally considered not good practice to exceed this velocity, because the cost of water was found to be excessive to the amount of work done. An increase of 100 ft/min, over the 360 ft/min velocity increases the heat transfer coefficient approximately 10 Btus.

Where water cost is excessive and wet bulb temperature is good, the firm has recently installed the evaporative type condensers. A unit having 96 sq ft of heat transfer surface and supplied with 1500 cu ft per min of air, was selected for comparison of performances at various wet bulb and condensing temperatures. At a condensing temperature of 90 F and a wet bulb of 70 F, the capacity was 4.5 TR and at 85 F WB the capacity was 1.5 TR. At 100 F condensing, the capacity was 7.5 TR at 70 F and 4.3 TR at 85 F WB. This is a heat transfer coefficient/-hr/sq ft of approximately 600 Btu at 70 F WB and 90 F condensing, compared to approximately 800 Btu at the higher condensing temperature of 100 F.

Efficiency of the entire system dictates the controlling factor for operation. It has been determined that 90 F condensing temperature (approximately 165 psig) is the maximum for efficient operation in compressor and horsepower requirements. At this temperature, it has been determined that the coefficient of heat transfer is approximately 150 Btus more for the evaporative condenser than the shell-and-tube type.

Prefers Vertical Receivers

The receiver gets considerable attention from the engineering staff too. Practice has been to construct the receiver of sufficient size to hold the entire refrigerant charge required for the largest evaporator in the plant, plus additional amount required to form an effective seal when all plant evaporators are in operation. The size of the receiver, therefore, is according to the size of the system, and the type of evaporator operation.

Although the firm uses both horizontal and vertical type receivers, in later years vertical installations have been preferred. Reason for this preference is the small amount of floor space required for installing (aproximately 9 sq ft of the largest installations. Plant construction generally dictates the type of receiver. As the flow of the refrigerant from the condenser is by gravity, the vertical receiver can only be installed where condensers are sufficiently high to permit such fall.

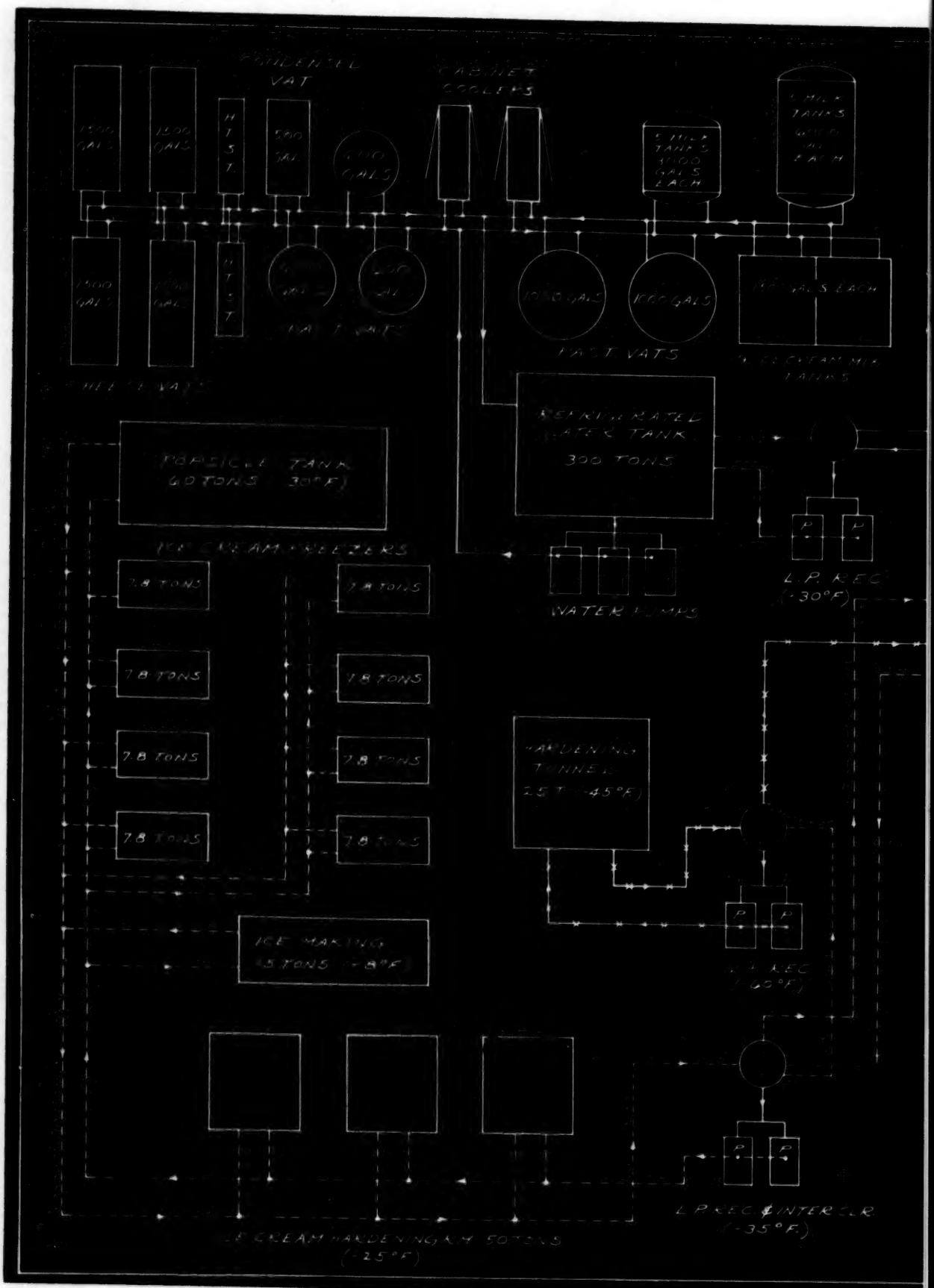
Carnation has employed use of both dry and flooded evaporator types in its installations, with preference toward the flooded type wherever possible. In the dry type with air passed directly over the coils, the heat transfer coefficient is approximately 1½ to 2 Btu/sq ft/hr/F. In the flooded units under the same operation, the heat transfer coefficient is increased to approximately 2 to 3 Btu. The heat transfer coefficient is sometimes increased in this type of operation by using a wetted surface. This increase ranges from 30 to near 100 percent, dependent directly upon the entering air dew point dry bulb, and wetting agent temperatures.

Chilled Water Coolant Efficient and Popular

Because of the fact that the temperature difference between the cooling medium and the refrigerant can be held within less than 10 F, and the heat transfer rate is so great between the product being processed and the cooling medium, chilled water systems have gained preference over direct expansion refrigeration systems for the high temperature loads. These systems employ the use of flooded evaporator design for cooling the chilled water, and have a heat transfer coefficient of approximately 80 to 200 Btu. Heat transfer between chilled water and product varies from approximately 350 to 800 Btus. The heat transfer rate is directly dependent upon water velocities, temperatures, and the specific design of the piece of processing equipment.

Liquid Sub-Cooling Advantages

For low temperature operations the company installed combination gas


CABINET COOLERS
MILK TANKS 1000 GALS EACH
REFRIGERATED WATER TANK 300 TONS
7.8 TONS
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7.8 TONS
ICE MAKING (5 TONS -8°F)
HARDENING TUNNEL (2.5 T -45°F)
L.P. REC (-30°F)
L.P. REC (-60°F)
L.P. REC & INTER CLR. (-35°F.)
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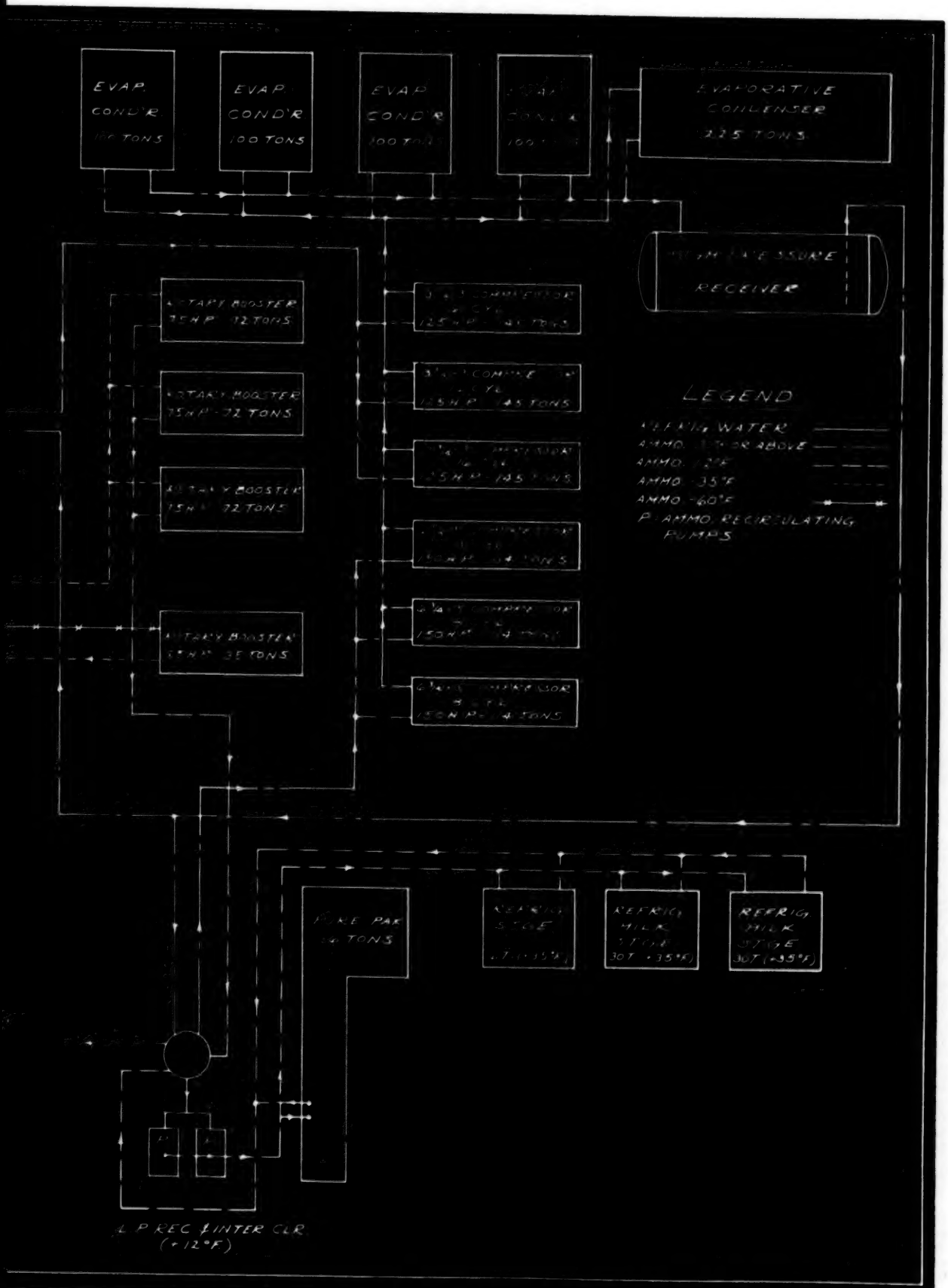
EVAP. COND'R 100 TONS
EVAP. COND'R 100 TONS
EVAP. COND'R 100 TONS
EVAPORATIVE CONDENSER 225 TONS
RECEIVER
ROTARY BOOSTER 75 H.P. 72 TONS
ROTARY BOOSTER 75 H.P. 72 TONS
ROTARY BOOSTER 75 H.P. 72 TONS
ROTARY BOOSTER 75 H.P. 36 TONS
125 H.P. 45 TONS
125 H.P. 45 TONS
150 H.P. 4 TONS
150 H.P. 4 TONS
150 H.P. 4 TONS
LEGEND
AMMO. 10°F OR ABOVE
AMMO. 0°F
AMMO. -35°F
AMMO. -60°F
P. AMMO. RECIRCULATING PUMPS
ICE PAN 40 TONS
REFRIG. MILK STOR. 30T (+35°F)
REFRIG. MILK STOR. 30T (+35°F)
L.P. REC. INTER CLR (+12°F)

intercoolers and liquid precoolers. Work of this unit is to cool the booster discharge gas to the pressure-temperature relationship desired in the secondary suction, and precool the liquid refrigerant flowing to the low temperature evaporators. Some recent installations also use this unit as a suction trap.

Comparisons have been made between precooled ammonia and normal condensing-temperature refrigerant. This comparison was made on the basis of standard booster installations operating under the maximum conditions of 0 psig booster suction; 35 psig intermediate pressure, and 150 psig high-side condensing pressure. It was found that with no sub-cooling a system requires circulation of .432 lbs of ammonia per minute to produce one ton of refrigeration at 0 psig suction, with a resultant power requirement of 1.565 hp ton. Sub-cooling liquid ammonia to the higher 35 psig suction, a system requires circulation of only .373 lbs/min to produce one ton of refrigeration at 0 psig suction, with a resultant 1.45 hp/TR. It was also indicated that smaller liquid lines can be installed when using sub-cooled refrigerant, in addition to the savings of approximately eight percent in horsepower requirements.

Systems Adequately Equipped For Oil and Vapor Removals

Increased speed of new type compressors demands assurance that only dry refrigerant vapors will enter the machines. Therefore, the company, has installed liquid suction traps for all main suction headers. This provides for removal of any liquid which might be entrained in the suction lines. To remove the liquid caught in the suction trap, there are installed automatically operated liquid pumps which discharge the liquid from the trap into the receiver. There are also installed liquid return systems such as manufactured by the H. A. Phillips Co., Chicago.

Since oil is generally absorbed in the refrigerant as it passes through the compressor, it is the practice to install oil separators on the discharge side of the compressor. With high speed compressor types, the separator has automatic float control for returning the oil to the crankcase of each compressor. However, in the older type installation where the piston clearances were not so great and oil entrainment was not excessive, a single manually-operated oil separator was installed in the main discharge header.

In newer installations Carnation has installed oil reclaimers and has piped the oil drain from each piece of equipment in the plant back to this unit, generally installed in the compressor room. Oil is forced back to the reclaimer by the hot gas discharge pressure. Liquid ammonia entrained in the oil is boiled off by the application of steam heat through a heat exchanger installed within the unit. Ammonia vapors are carried away by a suction line to one of the main suction headers. After all ammonia has been removed, the oil is drained from the unit and it is ready for a repeat operation.

Purgers Promote Efficiency

It has been standard company practice to install automatic purge systems to remove non-condensable gases from condenser and receiver. Efficiency of the entire system is greatly impaired by the presence of only a small amount of these gases; one-half pound of air, which is the equivalent of about 6 cu ft of volume at atmospheric pressure, will cause an increase in condenser pressure of approximately 10 pounds. This corresponds to a decrease in capacity of about 10 tons of refrigeration.

Lists Protective Devices

Besides control equipment and protective devices already mentioned, it has been general practice to install all of the following: compressor cut-out protection and alarm; complete relief systems, with fire department blowdown mixing station for expelling the complete refrigerant charge; high level control on all evaporators, inter-connected electrically to solenoid valves in the liquid lines for positive shut-off; high head pressure protection and alarm, inter-connected electrically to the main electric feeder to shut down each or all compressors; high level alarms and indicating pilot lights in case a liquid pump, float control, etc. fails to function properly.

Operating engineers have witnessed some trouble with mechanically operated float controls (and some of the electrically operated units too,) particularly on low temperature work. At present the Engineering department is experimenting with several new type electrically operated controls which use mechanical or electronic contacts. It is hoped that these units will give a solution to most float problems.

Piping Practices Described

Piping systems in Carnation's larger plants are generally quite complicated. From experience the engineering department has established design velocities for all refrigeration piping and selects all liquid, suction, and discharge lines accordingly. Good practice dictates that suction piping velocities range between 2000 to 5000 fpm; discharge velocities, between 6000 to 10,000 fpm, and liquid, between 180 to 360 fpm. Condenser and chilled water piping are designed for velocities between 200 to 360 fpm, while jacket water to compressors is established at approximately one-tenth gpm/ton of compressor capacity. Make-up water to cooling towers and evaporative condensers is approximately the same.

Liquid Recirculation System Planned For New Plant

A new fresh milk and ice cream plant at Seattle, Washington, is under construction. Incorporated in the design is a comparatively new refrigeration system known as an "Ammonia Liquid Recirculating System". Expected advantages are as follows:

Simple hand expansion control (or orifices) may be installed at evaporators, instead of more expensive and troublesome float or thermostatic expansion valve control. Such an installation requires practically no maintenance or adjustment.

One liquid level device is required in the system. It will be located in the compressor room where operation can be easily observed.

Individual suction traps on evaporators scattered throughout the plant are replaced by single large vessel in compressor room, eliminating possibility of liquid carry-over to the compressors, without use of other auxiliary equipment specially designed for this purpose.

Evaporator coils can be rapidly emptied to permit fast and complete defrosting.

Reduces the presence of compressor oil in low side evaporators, permitting more effective heat transfer. Oil in the low side may be drained from central point (at circulating pump suction trap).

Assures complete wetting of all evaporator surfaces for maximum efficiency.

Top feeding of refrigerant may be employed in evaporators, permitting reduction in operating ammonia charge.

Substantial savings may be realized in maintenance due to the elimination of multiplicity of refrigeration controls, simplification of removal of compressor oil from the system, and the elimination of the possible liquid carry-over to the compressors.

Installation at actual savings in

first cost is anticipated in larger plants which have multiplicity of evaporators.

In the category of disadvantages: Since liquid is circulated at evaporator temperature, all lines must be insulated. (It is believed that in larger plants the additional cost of insulating liquid lines, will be more than offset by savings in individual liquid controls and suction traps, and elimination of separate suction line liquid return systems to protect compressors from liquid carry-over).

Use of suction pressure regulators

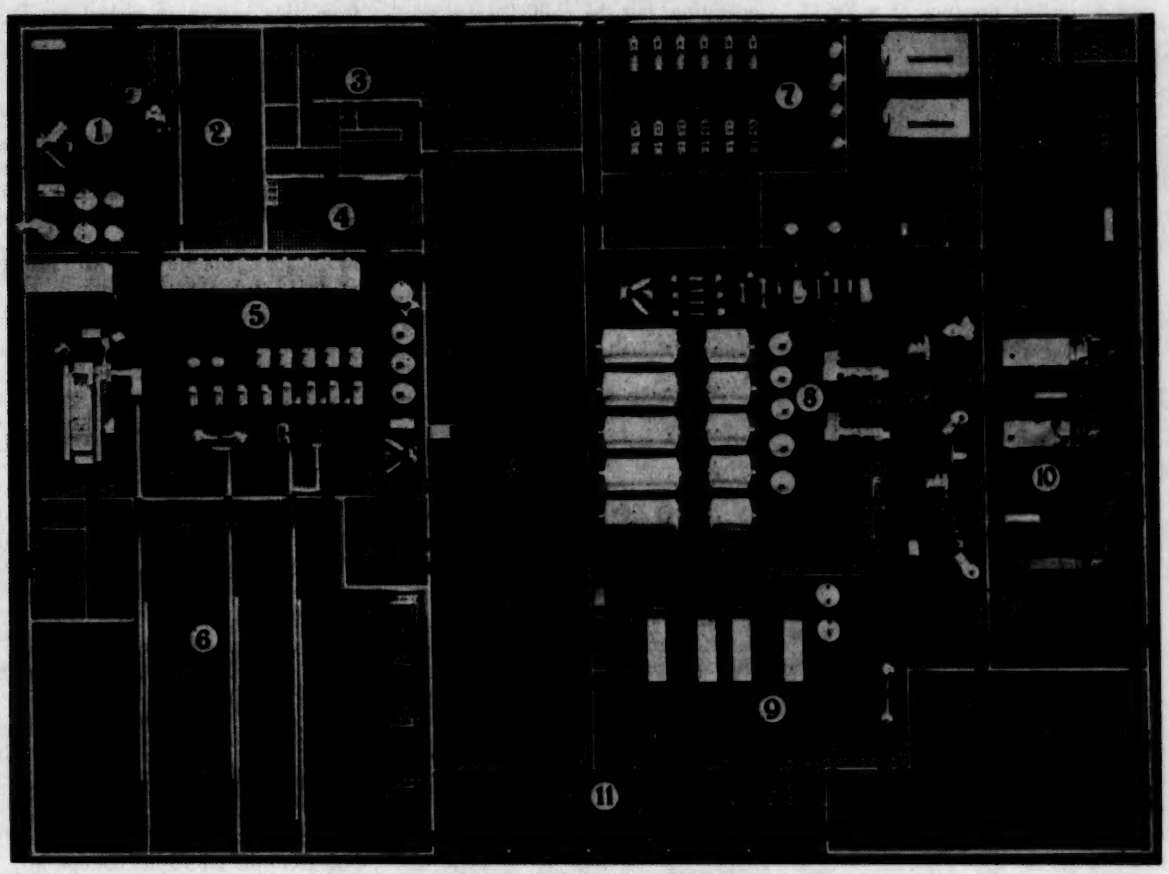

Fig. 5 — Mock-up of Carnation Milk Company plant.

(1) Receiving for Grade "B" milk, cream, plastic cream, anhydrous fat, empty mix cans, etc. Units at upper right hand corner are can washer and weighing equipment; in the left hand corner, the novelty mold washer. Equipment at lower left of room is vacuum pen, hot wells, and the condensed milk cooking facilities. Two small tanks right of these are chocolate kettles for novelty operations.

(2) Refrigerated raw products room, storing sales mix, cream, fruits, etc.

(3) Engineer's office, plant maintenance shop, parts storage, electric panel room, toilets and lockers, and stairway to second floor.

(4) Designated as C-I-P room. Here is installed all "cleaned-in-place" cleaning equipment for the entire plant, thus making a central cleaning system. All special portable cleaning equipment is also stored in this room.

(5) Ice cream processing room. Tanks at upper end are mix and raw products storage tanks. Unit at left is popsicle (brine) tank and novelty operation. Equipment in center is mix flavor tanks, ice cream freezers, packaging and bulk filling equipment. Equipment at right wall is for mix making and cooling. Small room right outside of processing room, is the ice cream superintendent's office.

(6) Ice cream hardening room. Although not shown here, a freezing tunnel is installed across the upper end. Equipment at right is battery of floor type evaporators. Rooms at right top are designated as electric panel room and specialty ice cream storage. Rooms to left are entrance and control laboratory. Ice cream load out is by means of conveyors running through the hardening room.

(7) Compressor room. Equipment indicated consists of compressors, receiver, and the intercoolers for the various temperatures of the "Recirculated Ammonia System". Evaporative condensers are located on the roof directly above the compressor room, as are cooling towers for all process water and vacuum pan.

Rooms directly adjacent (below) the compressor room are the main electric utility and electric panel rooms. Right of the compressor room is the boiler plant. Offset in this area is the pump room in which is installed all hot and cold water pumps for processing. The chilled water unit is located on the roof directly above this room. Small room to right is stairway to second floor.

(8) Milk processing room. Equipment (top row) from left to right: raw milk cooler, clarifiers, separators, pumps, H.T.S.T. pasteurizers, and homogenizers. Tanks to left are for raw and finished product storage. Vertical tanks in the center are by-products pasteurizers. Equipment to right is glass and paper bottle filling.

(9) Cottage-cheese manufacturing room. Equipment consists of cheese vats, cream and starter tanks, with packaging to the right. Room at the extreme lower right hand corner is pasteurized bottled milk storage. This room is small in comparison to size of the plant, but vertical space is utilized by employing case stackers. Much of the product is also loaded directly into relay trucks.

(10) Bottle wash and case return room. At upper right is the public utilities vault in which are installed the gas and water meters.

(11) Shipping dock with general storage area through the plant. Various small rooms off the dock are offices, toilets, electric panels, and specialty load out room including dry ice operations. Stairway to second floor, milk department superintendent's office, and parts storage is located between general storage and cheese manufacturing.

to provide widely varying suction pressures for individual evaporators operated on a common suction line, is limited by the head developed by the recirculating pump. (For example: On a system operating at zero pounds suction pressure, if a liquid recirculating pump is used which develops 20 psi it would be impossible to operate an evaporator on this system by means of a suction pressure regulator set at 25 psi, because the regulator setting would prevent pump from delivering liquid through the evaporator. However, it is understood that application of suction pressure regulators to liquid ammonia systems within the limitations imposed by pump head, have been made very successfully.)

General layout of the plant and equipment for Seattle is shown in Fig. 5. It will be noted that the ice cream department is to the left with the compressor room, boiler room, and milk department to the right. Through the center of the building is the operating warehouse with the maintenance shop at the extreme upper center, and shipping and receiving operations at the lower center. The general offices, additional warehouse facilities, etc. are on the second floor.

Four Systems Described

Schematic diagram Fig. 4, illustrates refrigeration systems employed in milk and ice cream plant pictured in Fig. 5. Chilled water refrigerating system is used for processing; includes condensed and raw milk cooling and storage, ice cream mix cooling and storage, cottage cheese cooling, H.T.S.T. pasteurizer cooling, and by-products pasteurizer cooling. Circulated ammonia system for refrigerated water operation is a simple high temperature (30 F) operation, connected directly into the 16 cylinder V/W machines. (Note tonnages specified for the chilled water unit as well as the compressors.)

These three 16-cylinder compressors, as well as the three 8-cylinder units discharge in the usual manner to the condensers, and from the receiver to the 30 F and 12 F loads. Although not shown on the diagram, one 16-cylinder compressor is connected into all suctions as standby operation in event of other compressor failure. It will be observed that the 12 F system is used as the precooler for liquid supply to the minus 35 F system, and minus 60 F intercoolers are supplied liquid from the minus 35 F drum. Precooling is by flashing at the 12 F vessel and all oil entrained in the refrigerant is removed at this point.

Use of the higher temperature suction drum for all liquid precooling would be better practice and obtain maximum efficiency for the entire operation, but the chilled water system is an intermittent operation. Therefore, the flash tank for that operation is independent. The 12 F suction runs directly to the 8-cylinder compressors. Ammonia from this 12 F intercooler circulates to evaporators of the raw products storage room, milk storage, and the Pure-Pak filling machines.

The minus 35 F system circulates ammonia through the ice cream hardening room, popsicle tank, ice cream freezers and the ice making equipment. This system suction also picks up the booster discharge of the sharp freeze tunnel system. Main suction line from the minus 35 F drum connects to the rotary boosters, which discharge into the 12 F intercooler.

The minus 60 F system circulates liquid ammonia through the evaporators of the sharp freeze tunnel (25 tons at minus 45 F). Main suction from this system is picked up by a rotary booster which discharges, as mentioned, into the minus 35 F intercooler. Plant is as completely automatic as possible, including automatic step control for all compressors.

The complete plant has installed approximately 35 tons of sharp freeze load, 216 tons of minus 35 F load, 342 tons of 12 F load, and 300 tons of 30 F load. Carnation looks with pride on its refrigeration installations, but from long experience in the industry the firm realizes that it takes research and study to keep abreast of most efficient production methods and operations.

Frozen Food Traffic Calls for Expert Management Says Forum

THE frozen food industry must be alert and watchful in dealing with its transportation problems, a National Frozen Food Convention group was told by T.C. Borden, Traffic Manager of Exchange Lemon Products, Corona, Calif.

Under sponsorship of the National Association of Frozen Food Packers, a group of leading frozen food transportation authorities discussed practically all aspects of the industry's problems at a forum held in connection with the annual meetings of frozen food men. Others on the panel included D. E. Carroll, vice-president, Western Frozen Foods, Watsonville, Calif.; B. M. Angell, vice-president, Stokely Van Camp, Indianapolis, Ind.; Otto Kopp, general freight traffic manager, Northern Pacific Railroad, St. Paul, Minn.; C. J. Jamison, northwestern manager, Fruit Growers Express Company, Chicago, Ill.; Milton Ratner, president, Emery Transportation Company, Chicago, Ill.; and Cyrus Weller, president, Frozen Food Express, Dallas, Texas. Moderator of the discussion was A. E. Stevens, vice-president, Minute Maid Corporation, New York.

In leading off the discussion committee of NAFFP, Mr. Borden emphasized the industry's need to embark upon a crusade to bring about freight rate reductions so that frozen food transportation costs, exclusive of protective services, will be no greater than for competitive products.

Another member, Mr. Carroll urged all groups involved in frozen food transportation problems to take a good look at themselves. He suggested many of the difficulties can be resolved by critical self-analysis. Top-level management of railroads is good, he said, but sometimes local carrier representatives fall down on the job because of poor communications from the top to the bottom. Mr. Carroll also urged the management of frozen food companies to pay more attention to their traffic departments. Efficient operation of traffic executives can mean great savings to the frozen food industry, he reported.

Carrier representatives indicated a great interest in meeting the needs of the growing frozen food industry. Railroad and carline representatives told of the vast expansion of their equipment to give frozen foods needed temperature protection.

Motor carriers on the panel reported their plans to work closely with the frozen food industry to develop improved equipment which will expand facilities for frozen food movement.

Another aspect of transportation problems was the question of frozen food industry support for protecting the position of regulated carriers. Mr. Angell concluded the panel discussion by assuring the carriers of the industry's support in this connection.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

Selecting and Using "Freon" Refrigerants

W. R. BARNARD
LaCrosse, Wisconsin

"Freon" compounds are the answer to refrigeration engineer's dreams — no other fluid has all the desired characteristics. — The Author

Second of two articles on "new" refrigerants, this paper of W. R. Barnard's is listed by NAPRE's Education Committee, as "recommended reading" in connection with Chapters 5 and 6 of the Association's official text, BASIC REFRIGERATION, by Guy R. King. The first article "Characteristics and Applications of Refrigerants — Old and New", by Mr. King, appeared in the April 1955 issue.

REFRIGERANT is virtually the life blood of any refrigeration system. "Freons", "Genetrons" and "Carrenes" are the best refrigerants and have replaced nearly all others because they are safer, more stable and require simpler equipment. They are derived from hydrocarbons, and those to be considered here specifically contain fluorine. They may, therefore, be called fluorinated hydrocarbons. While "Freon" can be derived from any of several base hydrocarbons, consideration will be given only to those which are derived from methane and ethane, the two simplest hydrocarbons.

Methane Derivatives

Considering first the methane derivatives, it is apparent from Fig. 1 that methane consists of one atom of carbon and four atoms of hydrogen. If all of the hydrogen atoms are replaced with chlorine, a molecule of carbon tetrachloride is obtained; a good cleaning substance and fire extinguishing agent, but not used as a refrigerant. By substituting a fluorine atom for one of these four chlorines, "Freon-11", "Carrene-2", or "Genetron-11", is developed. Replacing a second chlorine with fluorine, "Freon-12" or "Genetron-12" is obtained. In a like manner, by replacing three chlorines, "Freon-13" is developed; and when all of the chlorine atoms have been removed and the molecule saturated with fluorine, the chemist arrives at "Freon-14". This is an illustration of the numbering systems which identifies fluorinated hydrocarbons and which describes their molecular structure.

Ethane Derivatives

Refrigerants which are derived from ethane are produced in much the same manner in which methane-base "Freons" were derived. Referring to Fig. 2 it is noted, however, that ethane contains two atoms of carbon and six of hydrogen. By replacing all of the hydrogen atoms with chlorine, hexachloroethane is developed. Without going through the entire process of substitution of fluorine for chlorine elements, it can be seen that "Freon-113" or "Carrene 3" contains three atoms of fluorine, and that "Freon-116" would be a fluorine-saturated molecule in which all of the chlorine atoms have been replaced by fluorine.

Nomenclature[1]

On the basis of the numbering system just mentioned, refer to Fig. 3 and consider the nomenclature of the "Freons". "Freon-12", or CCl_2F_2 is called dichlorodifluoromethane. The name shows that it contains two chlorine and two fluorine atoms attached to the one carbon atom in each molecule. In like manner, the names of all the "Freons" indicate the number of chlorine and fluorine atoms, and the number of carbon atoms in that order. "Freon-22", or $CHClF_2$, is monochlorodifluoromethane. This molecule has retained one of its original hydrogen atoms. The name of the substance does not tell this, but simple arithmetic shows that one chlorine and two fluorines are only three-fourths of the number of atoms which must be attached to methane's one carbon atom.

Notice that the methane-derived Freon number has two digits; the first is always one higher than the number of hydrogen atoms remaining, while the second digit indicates the number of fluorine atoms present.

The ethane-derived Freons have three digits in the number. The first digit is always 1, and means merely that the Freon was derived from ethane. The second and third digits are indicative of exactly the same meaning applied to the methane-derived Freons.

Importance as Refrigerants

The importance of the fluorinated hydrocarbon compounds as refrigerants is based primarily on their chemical and physical stability. Their physical properties make these substances ideal for use in refrigeration systems. They do not break down under the temperatures and pressures which are encountered in refrigeration work. They do not react with those materials used in construction of refrigeration machines or systems. Moreover, they do not react to any great extent with water or oil.

While there are several other refrigerants in use today the commercially available fluorinated hydrocarbon compounds are more desirable

[1]See also Table 5.

W. R. Barnard is engineer for a prominent compressor and heat exchange equipment manufacturer. Although his opinions are not unanimously held by all members of NAPRE's Education Committee, his treatment of the subject and the illustrations should prove very helpful to the practical engineer in the larger refrigerating industries, where many of the "new" refrigerants are becoming an every-day part of the engineer's responsibility.

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Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, an educational association.

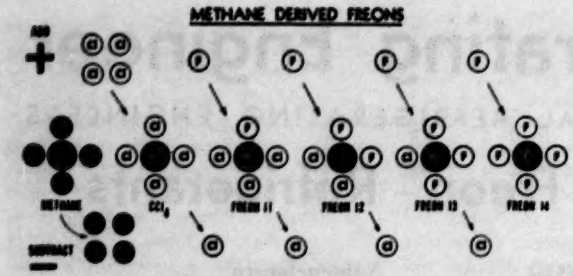


Fig. 1 — Refrigerant derivatives of the hydrocarbon, methane. By "subtracting" hydrogen atoms and "adding" halogens of Chlorine and/or Fluorine, a family of "safe" refrigerants was developed. In this representation of each refrigerant molecule, solid black figures represent Hydrogen atoms: those labelled "C", carbon; CL, chlorine and F, fluorine.

Fig. 2 — Derivation of trichlorotrifluoroethane from the crude oil hydrocarbon, ethane. Like the methane series, subtraction of hydrogens and chlorines, and addition of chlorines and fluorines, respectively, develops new gases of various characteristics. Legend for symbols in Fig. 1 applies here also.

for nearly all applications. Primary advantages are their non-flammable, nonexplosive, and non-toxic qualities (Table 1 and Fig. 4); extremely important safety features. These "new" refrigerants have a peculiar characteristic, however, of forming a deadly gas when burned in the presence of air. This gas is phosgene, a highly regarded war gas. The presence of phosgene can be readily detected because of its pungent odor, and is noticeable when using the Halide torch to detect halogenated refrigerant leaks.

TABLE 1 — ADVANTAGES OF "FREON" REFRIGERANTS

1. Non-Flammable
2. Non-Explosive
3. Non-Toxic

Although the concentration of phosgene does not assume dangerous proportions in the ordinary sized equipment room it is important to avoid all leaks in the refrigeration system and to keep open, uncontrolled flame away from all equipment which contains "Freon", "Genetron" or "Carrene". Over 1000 F is required to decompose fluorinated hydrocarbon refrigerants. Since average flame temperature is higher, decomposition may occur. To minimize this danger, work areas should be adequately ventilated, preferably with a forced draft of fresh air. This is good practice at any time, but especially when an open flame of a leak detector or welding torch is to be used in presence of these "new" refrigerants.

Precautions

Halogenated refrigerants, as these "new" gases are often called are colorless and odorless. However, they can be dangerous if they come in contact with the skin, because of the low temperatures produced upon evaporation. This evaporating action can cause serious freezing of the tissues of the eyes and other parts of the body.

In selecting replacement parts such as gaskets, care should be exercised. "Freon" compounds are as harmful to natural rubber as is oil. Natural rubber decomposes, becomes swollen and mushy, when in contact with these compounds. Neoprene and other synthetic materials are used by system component manufacturers. Replacement of these parts should be made through the manufacturer, or through authorized suppliers. It is important that the specific compound used be mentioned when ordering gaskets, since the composition of the gasket material varies somewhat with the compound to be used.

Refrigeration Compressors

Consider these various "new" refrigerant compounds as they are used by industry in three types of refrigeration compressors: the reciprocating, the rotary and the centrifugal compressor.

The reciprocating machine (Fig. 4) is the best known. This type of equipment can be utilized for both air conditioning and for low temperature applications because it can accommodate halogenated refrigerants whose characteristics lend themselves to almost any desired temperature application. These compressors have the ability to develop very high pressure differentials although they move the gas at a relatively low rate. Therefore, those fluorinated hydrocarbon compounds which are used in reciprocating units have a *low specific volume*, which is interpreted as *cfm of gas per ton of refrigeration*. The amount of refrigeration which can be accomplished per pound or per cubic foot is high. Because of this, relatively small piping can be used to connect the various components of the refrigeration system. Those compounds which are commonly used in reciprocating compressor systems are dichlorodifluoromethane (CCl_2F_2), monochlorodifluoromethane ($CHClF_2$) and monochloropentafluoroethane (C_2ClF_5) (Table 2)

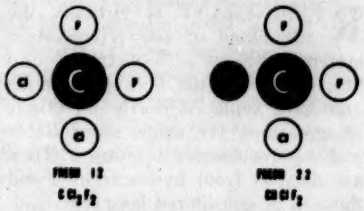


Fig. 3 — Molecular structure, trade names, and chemical formula of two "numbered" refrigerants.

Properties of Low Specific Volume Halogenated Gases

Dichlorodifluoromethane (CCl_2F_2) is more widely used of the three mentioned for reciprocating compressors. It is also used in other types of compressors, although primarily for special applications. "Genetron-12", or "Freon-12", has a boiling point at atmospheric pressure about minus 22 F. However, compare "Freon-12" with "Freon-22", and "Genetron-12" with "Genetron-141", at the average air conditioning temperatures of 40 F suction and 105 F condensing. At 40 F "Genetron-12" and "Freon-12" have a suction pressure of 37 psig and a flow rate of 3.13 cfm/ton. At a condensing temperature of 105 F, they are at a pressure of 126 psig.

"Genetron-141" and "Freon-22", lend themselves readily to low temperature applications because of a low boiling point of about minus 41 F, at atmospheric conditions. However, because of the somewhat higher pressures encountered in monochlorodifluoromethane ($CHClF_2$) refrigeration systems, as compared to systems designed for dichlorodifluoromethane refrigerant, the strength of materials should be investigated. Higher discharge pressures mean higher loads on compressor bearings,

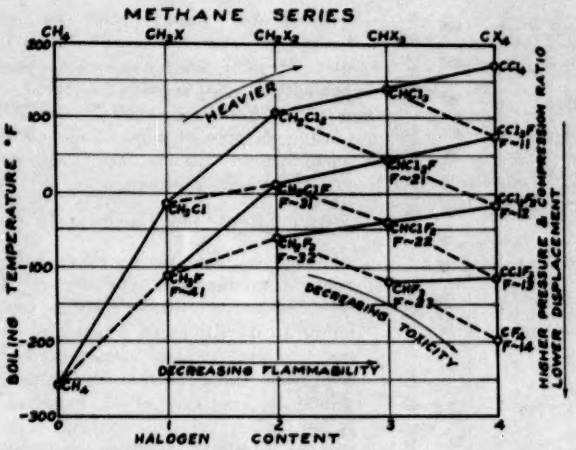


Fig. 4 — Toxic and flammable qualities of Methane Series, Halogenated Refrigerants. — sketch by Guy R. King based on data by Kinetic Chemicals.

Fig. 5 — Author illustrates halogenated refrigerants commonly used with reciprocating compressors.

drive shafts, connecting rods, seals, etc. "Freon-22" and "Genetron-141" have a pressure of 69 psig. at 40 F and 213.1 psig at 105 F condensing. It is necessary to circulate only 1.97 cfm/ton at 40 F. Therefore, these brands of monochlorodifluoromethane are adaptable to small high pressure systems. Its main drawback is that it is still considerably more costly than dichlorodifluoromethane.

The third "Freon" commonly used in reciprocating machines is "Freon-115". This "Freon" has characteristics between those of "F-12" and "F-22". It has a boiling point of about minus 38 F at atmospheric pressure. Its pressure is about 59 psig at 40 F and about 185 psig at 105 F. It flows at the rate of 2.35 cfm/ton. There is a compound refrigerant known as "Carrene 7" which likewise has characteristics falling between those of "F-12" and "F-22". This product consists of 26 percent "Freon-152" and 74 percent "Freon-12". "Carrene 7" and "F-115" are used to attain rated capacities of "Freon-12" reciprocating machines when operating on fifty cycle current. They can also be used to match a compressor of certain desired capacity to a brake horsepower corresponding to an available motor size.

Other Pressure-Temperature Relationships of "Freons"

The pressure-temperature chart (Fig. 6) illustrates the relationships of the new family of halogenated compounds. Pressure and temperature are directly proportional. Those gases with the lowest cfm/ton flow rate appear on the left of the chart. "Freons"-12, -22 and -115 lie in this position. "Freon-13" refrigerant, whose pressure-temperature curve appears toward the left of Fig. 6, has recently been used commercially for temperature requirements in the neighborhood of minus 70 F to minus 150 F. (See Industrial Refrigeration, Nov. '54, page 53). "Freon-14" refrigerant is not yet commercially used, but has prospect of serving temperature requirements from minus 100 F to minus 225 F.

Rotary Compressors

Small rotary compressors (Fig. 7) are commonly used in household refrigerators and freezers. They can be considered as semi-positive-displacement compressors which develop intermediate pressure differentials. Since they are used in cabinet units and for small systems, it is desirable to use refrigerants which have a fairly high refrigerating effect but a low flow rate. Compounds commonly used in these rotary or "vaned" compressors are "Freon-21" (dichloromonofluoromethane/$CHCl_2F$) and "Freon-114" (dichlorotetrafluoroethane/$C_2Cl_2F_4$).

As shown in Table 3, dichloromonofluoromethane ("Freon-21") has a boiling point at atmospheric conditions of about 48 F. At 40 F. suction temperature, its pressure is 5 inches mercury (vacuum) and its flow rate is 9.29 cfm/ton. At 105 F. condensing temperature, it is at a pressure of 27.7 psig. Dichlorotetrafluoroethane ("Freon-114") boils at about 38 F. at one atmosphere, has a pressure of 0.5 psig at 40 F Suction, and has a flow rate of 9.05 cfm/ton of refrigeration. Its pressure at a condensing temperature of 105 F, is 35.3 psig.

It is evident from this data that this refrigerant would produce good air conditioning temperatures at about atmospheric pressure. However, since it is used for refrigeration at freezing or below freezing temperatures, the rotary compressors in which they are used must operate at subatmospheric pressures.

Referring back to the pressure-temperature chart (Fig. 6), it will be noted that the curves for "Freons" -21 and -114 are located near each other and to the center of the chart where the 40 F line crosses the atmospheric pressure line.

Centrifugal Compressors

Centrifugal compressors (Fig. 8) are two-stage or multi-stage machines which are capable of producing relatively low pressure differentials. They are high speed units which are not only capable of moving large volumes of refrigerant gas, but actually require large quantities to keep their efficiencies high. Therefore the refrigerants which are used with centrifugal compressors must produce the required amount of refrigeration with relatively small differences between suction and condensing pressure, and will be characterized by high specific volumes in terms of flow rate. Most commonly used are trichloromonofluoromethane ("Carrene 2", "Freon-11", or "Genetron-

TABLE 2 — PROPERTIES OF "FREONS" FOR RECIPROCATING COMPRESSORS

	Boiling Point At 1 ATM	Pressure At 40 F Evap.	Pressure At 105 F Cond.	Cfm/Ton At 40 F Evap.
Freon 12	−21.64 F	37.0 psig	126.0 psig	3.13
Freon 22	−41.44 F	69.0 psig	213.1 psig	1.97
Freon 115	−37.7 F	59.0 psig	185.3 psig	2.35

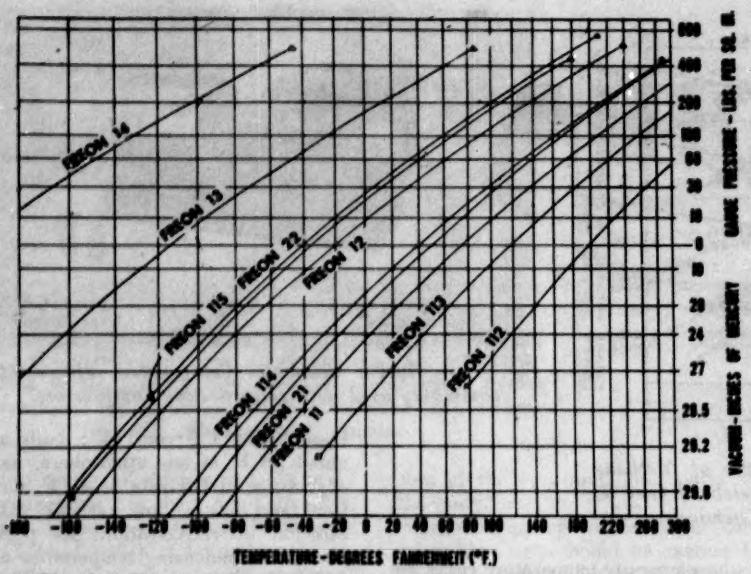


Fig. 6 — Pressure-Temperature relationships of "Freon" compounds.

11") and trichlorotrifluoroethane ("Carrene 3", or "Freon-113"). See Table 4.

The pressure-temperature curve for trichloromonofluoromethane (CCl_3F) lies quite close on the chart (Fig. 6) to the pressure-temperature curve for dichlorotetrafluoroethane ($C_2Cl_2F_4$). CCl_3F has a boiling point of about 75 F at atmospheric pressure. At 40 F suction temperature, its pressure is 15 inches Hg, (vacuum), and it is circulated at the rate of 16.08 cfm/ton. At 105 F condensing, it is at a pressure of only 11.3 psig. Obviously the low side of the system is operating well below atmospheric pressure.

Trichlorotrifluoroethane ("Carrene 3", or "Freon-113") has over twice the flow rate of trichloromonofluoromethane, and its pressure-temperature curve lies well to the right of the pressure-temperature curve for "Carrene 2", "Freon-11", and "Genetron-11" (all CCl_3F) on the chart. "Freon-113" boils at about 118 F at one atmosphere. At 40 F suction temperature, the pressure is 24.3 inches Hg (vac) and the flow rate is a high 39.0 cfm/ton. The pressure at 105 F condensing is 6 inches Hg (vac). For air conditioning applications, the entire system operates at sub-atmospheric pressure.

Use of centrifugal compressors with these high specific volume compounds is limited to installations where the compressor is connected closely to its evaporator and its condenser. The reason for this is simply that the connecting piping assumes such large proportions that these components are built as one unit. These units are used as water or brine chillers with water cooled condensers.

Refrigeration System Design

Design of a refrigeration system should be gauged by the specific refrigerant which is to be used in it. That is, the type of system which is to be installed depends primarily on the temperatures which are to be produced. Once the type of compressor is determined, the system design then becomes largely a matter of adequate evaporators and piping. The number of rows in a direct expansion coil and the size of liquid and suction piping depends on the refrigerant temperature and flow rate of the gas compound to be used. A system designed for a particular "Freon" compound will not operate effectively with a substitute.

Non-Interchangeability

Do not under any circumstances replace an original fluorinated hydrocarbon charge specified by the manufacturer with any other refrigerant. Each compressor is designed to operate at certain pressures. Since each halogenated gas has its own pressure-temperature characteristics as we have seen from the chart (Fig. 6), they are not interchangeable. This particularly applies to the replacement of "Freon-12" with "Freon-22" for the purpose of converting to low temperature applications, without proper system redesign.

Water Effects On The System

Water is soluable in these halogenated refrigerants. The degree of solubility varies with the specific compound in question and depends upon the temperature and pressure. The important thing is that the system should be kept free of all moisture. Water, when carried in these compounds, but not dissolved in them, can attack metals and cause corrosion. With a given quantity of water in a system, the amount of free water which is available to cause damage is inversely proportional to the rate of solubility of water in the compound.

This free water will freeze in such places as the expansion valve and other restricted orifices, thereby partially or totally incapacitating the refrigeration system. The addition of anti-freeze is not recommended as a method of overcoming this problem. Instead, a system which contains excessive moisture should be completely evacuated at a high vacuum and recharged with dry refrigerant. (See NAPRE Question Box, Industrial Refrigeration, May 1954, Pag 37, No. 997). An initial or a replacement refrigerant charge should be passed through a dehydrator of adequate size containing silica gel, activated alumina or calcium sulphate.

Compressor Oils

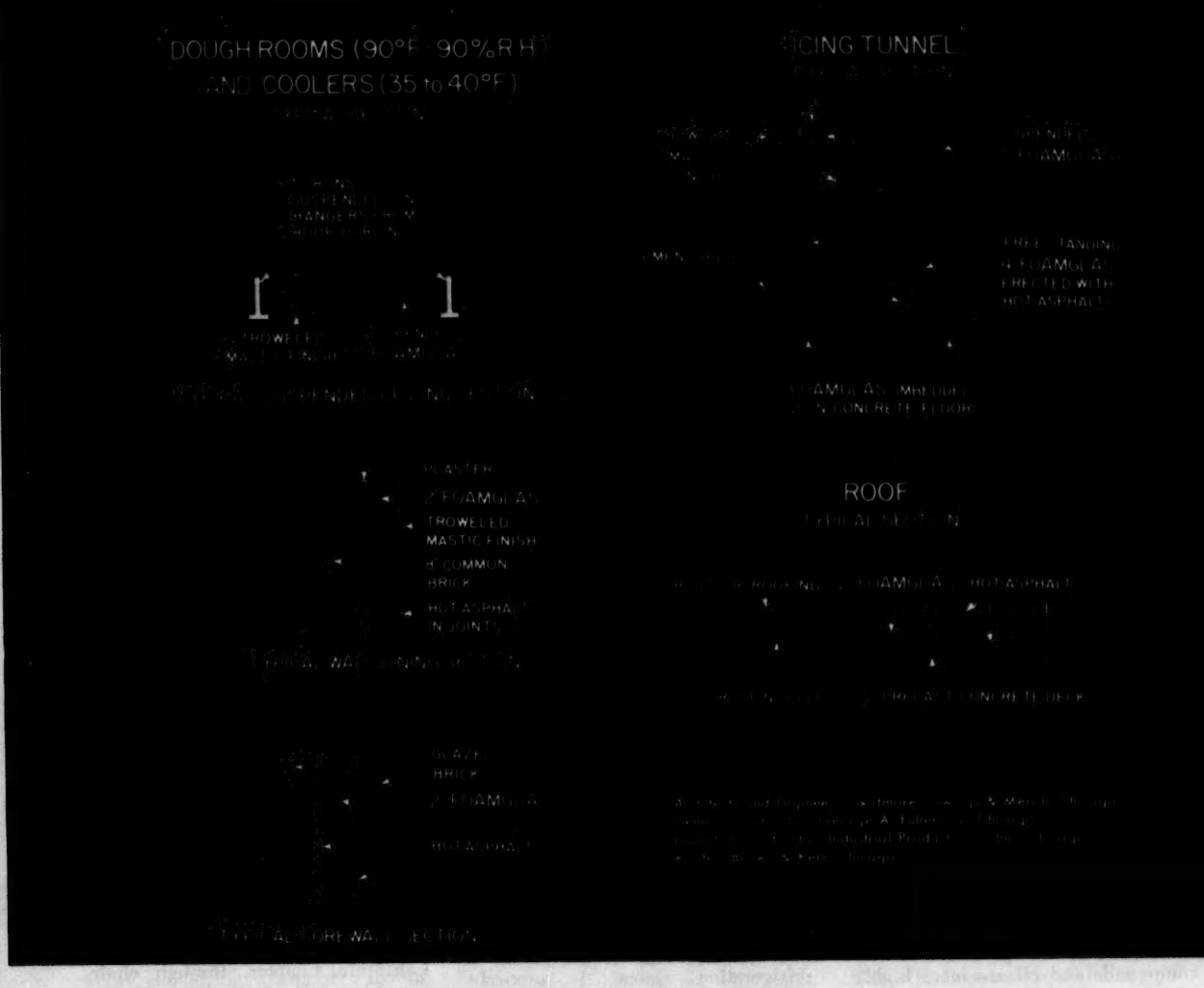
Oils for use in refrigeration compressors should be pure mineral oils containing no acids, water, soaps, or other adulterants. For air conditioning applications, these oils should be of a paraflin base for use in centrifugal machines, and of either ciprocating compressors. For low temperature applications, naphthene base

TABLE 3 — PROPERTIES OF "FREONS" FOR ROTARY COMPRESSORS

	Boiling Point at 1 ATM	Pressure At 40 F Evap.	Pressure At 105 F Cond.	Cfm/Ton At 40 F Evap.
Freon 21	48.06 F	−5.0" Hg	27.7 psig	9.29
Freon 114	38.39 F	0.5 psig	35.3 psig	9.05

TABLE 4 — PROPERTIES OF "FREONS" FOR CENTRIFUGAL COMPRESSORS

	Boiling Point At 1 ATM	Pressure At 40 F Evap.	Pressure At 105 F Cond.	Cfm/Ton At 40 F Evap.
Freon 11	74.78 F	15.0" Hg(Vac.)	11.3 psig	16.08
Freon 113	117.63 F	24.3" Hg(Vac.)	6.0" Hg(Vac.)	39.0



Only moisture-proof FOAMGLAS can effectively insulate all these for United Biscuit . . .

hot, humid dough rooms . . . coolers . . . icing tunnels . . . roof

K. F. MacLellan, president of United Biscuit Company, tells how they benefited from the unique properties of FOAMGLAS insulation at their Sawyer Division's big new plant in Melrose Park, Illinois:

"To insulate the walls of dough setting rooms kept at 90° F.—90% relative humidity *and* coolers kept at 35 to 40° F. we picked FOAMGLAS. It stays completely dry, fully efficient in both locations to help control temperature and humidity. Also it is inorganic and doesn't support vermin life . . . that's particularly important, of course, in all food plants.

"The extra rigidity of FOAMGLAS enabled us to suspend it between T-irons to form dropped ceilings. That's cutting our operating costs by reducing the volume of air to be heated or cooled. Its unusual strength enabled us to erect free-standing tunnels in which we harden freshly applied cake frostings. The elimination of structural supports reduced construction costs."

Mr. MacLellan concludes: "We also insulated the entire roof area with fireproof FOAMGLAS. No other insulation could have given us such effective results on such diverse, difficult applications."

Find out today how *you* can save by using FOAMGLAS. Write for your choice of booklets on insulation for buildings, cold storage spaces, piping or equipment.

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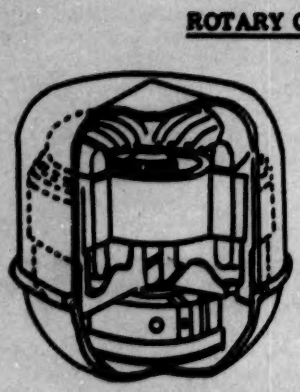

Fig. 7 — Cutaway sketch of "hermetic" illustrates most common use for two refrigerants of the "new" family.

Fig. 8 — Author again pictures type of compressor using certain classes of refrigerants — the centrifugal unit.

oils should be used in all types. The correct oil to use is as specifically recommended by the equipment manufacturer for the application. The use of any other oil can mean trouble.

Lubrication

The lubrication problem which most often confronts an engineer is that of foaming in the crankcase of the reciprocating compressor. This is a very commonplace occurrence and merely indicates the fact that the refrigerant compound is boiling out of the oil. The unfortunate part is that the oil, which forms a film around each particle of refrigerant, is bubbling out of the crankcase into the piping and evaporator. "Freon" compounds and oil are more highly miscible at high temperatures than they are at low. Therefore, when the oil and refrigerant mixture gets to the evaporator and undergoes a sudden drop in temperature, a large portion of the oil separates out. An oil trap must often be installed to return this deposited oil to the crankcase. As is the case with all mechanical contrivances, the compressor will not operate indefinitely without lubrication.

Centrifugal compressors are not plagued by the foaming problem as reciprocating compressors are, although they do experience the mixing of oil with the refrigerant charge to some extent. Since the oil is supplied only to the impeller shaft bearings in these machines it can be effectively sealed off from the gas passages thereby minimizing the problem. Even in these machines, however, a heater is installed in the oil reservoir in order to evaporate the refrigerant out of the oil.

New Compounds are Cleaners

Hydrocarbon compounds are very effective cleaning agents. When a refrigeration system is properly cleaned and charged, it will remain essentially free of impurities. When the "Freon" charge is removed, however, it is very important that the system be evacuated of air and moisture, and then sealed against dirt and moisture. The very clean internal surfaces are extremely susceptible to rust and corrosion once the "Freon" compound and the protective oil are removed.

TABLE 5 — NOMENCLATURE, "NEW" REFRIGERANTS COVERED IN THIS DISCUSSION

Trade Name	Chemical Name	Chemical Formula
"Freon-12" "Genetron 12"	Dichlorodifluoromethane	CCl_2F_2
"Freon-22" "Genetron 141"	Monochlorodifluoromethane	$CHClF_2$
"Freon-115"	Monochloropentafluoroethane	C_2ClF_5
"Freon-13"	Monochlorotrifluoromethane	$CClF_3$
"Freon-14"	Tetrafluoromethane	CF_4
"Freon-114"	Dichlorotetrafluoroethane	$C_2Cl_2F_4$
"Carrene 2" "Freon-11" "Genetron 11"	Trichloromonofluoromethane	CCl_3F
"Carrene 3" "Freon-113"	Trichlorotrifluoroethane	$C_2Cl_3F_3$

Golf Tournament Planned At Los Angeles Convention

HOST Chapter at NAPRE's 46th Annual Convention, Los Angeles has already announced the scheduling of a "rope-yarn Sunday" commencing at noon, Wednesday, November 9. The meeting is scheduled for November 8-10, 1955 at the Ambassador Hotel, with committee and board meetings on the 7th and 11th.

According to Larry Benedict, publicity chairman for the affair, a "rope-yarn Sunday" is naval slang for a mid-week half-holiday. One feature of the holiday is not naval or marine, however, unless water holes would qualify participants as sailors. California Chapter, through chairmanship of V. A. Stubblefield, has tentatively scheduled a golf outing at the Rancho Golf and Country Club.

Precedents will be shattered this year, as the ladies are invited to participate in the tournament! Other activities for this social afternoon and evening are yet to be announced, but rumors are rampant that an affair is being arranged at the famous Moulin-Rouge Theatre Restaurant.

Summary of educational features for this meeting was given in April, INDUSTRIAL REFRIGERATION.

Other industrial applications to be discussed include dairying, brewing, food freezing, ice making, candy manufacturing and meat packing. In the transportation field there will be talks on marine and naval applications of recent date, a summary of developments in railroad refrigeration, and aircraft refrigeration. A discussion is planned on commercial applications such as refrigeration for supermarket commissary or warehousing centers. Electrical equipment and refrigeration control devices will have their share of the program, as will new developments in the field of protective coatings.

From the President's Desk

Membership Drive Continued, Films Circulated And Regional Education Activities Praised

NEW members obtained as a result of our nationwide drive in the cold storage industry has led to the conclusion that the drive should be continued as long as these unusual number of inquiries turn up. Membership Chairman Bill Orton reports that Detroit Chapter was the first to follow-up an inquiry and sign a new member.

However, the greatest success in the drive has not occurred within the chapters. Most all of the new members are being signed up by the national committee, as members-at-large. The task of following up inquiries outside of chapter jurisdiction has not been an easy one, and the national committee has had to seek assistance from members-at-large residing near the prospects.

Since the chapters are just now beginning to follow through on the leads provided, it has been decided to continue the membership drive in the refrigerated warehousing industry through October 1. It is suggested that many of the chapters may be able to arrange a "cold storage night" meeting. At this meeting, engineer and management prospects of the industry would be guests of the chapter. An appropriate program should be arranged and the membership committee given an opportunity to present the benefits derived from NAPRE association.

Air Conditioning Engineers Urged to Join NAPRE

The second national membership drive scheduled for 1955 was to open in May among engineers employed in large air conditioning installations in public buildings. It is believed that the extension of the cold storage drive will not interfere with those plans. The membership committee has a new idea on promoting competition for new members not only between the chapters, but also between the members-at-large and the chapters.

In the past two years the national committee has shown how membership can be promoted effectively by direct mail. The committee now challenges the chapters to produce equal results on their own initiative. In other words, the membership committee believes that each chapter can develop a prospect list and sign up as many new members, proportionately, as the national committee. The membership chairman suggests that each chapter compile a list of prospects in this field immediately and then go to work on them.

Suspension and Conservation

Vice-president Leroy Etzel reports that we are up to our usual tactics of allowing a certain percentage of our membership to be suspended for failure to remit dues by the April 1 deadline, now one month past. It is believed that 90 percent of these suspensions can be turned into reinstatements through a personal contact by a chapter officer, a committeeman or a member friend.

Vice-president Etzel has recommended formation of a conservation committee in each chapter, although he seems to think that St. Louis Chapter has come upon a fine original idea of their own in conservation of members. In that chapter they have formed three teams. The chapter has put up a sufficient number of awards in the way of clothbound texts (Basic Refrigeration) to go to the winning team. Each team has been assigned a certain number of delinquent members. The team which does the best job of conserving members will capture the entire list of awards.

Chapter Manuals Delivered

Congratulations to Guy R. King, our assistant educational chairman, on his Foreword, Introduction and first two chapters of the Manual for use in connection with NAPRE's refrigeration course. The promptness of the educational committee, under the direction of Dean Harold Hayes and Guy, in delivering the first sections of the Manual to the chapters on schedule is much appreciated. Three units were delivered to each chapter: one for the secretary's permanent files; one to the program or educational chairman; and, of course, one to the chapter instructor. Where chapters have more than one instructor, additional copies will be made available.

Convention Films Scheduled

Movies made at the New Orleans Convention in 1954 by erstwhile public relations committeeman Larry Benedict of Los Angeles, are presently circulating to the chapters for showing at their meetings. The film was shown at Los Angeles and at Yakima, Wash., during March. Reports indicate that the review was thoroughly enjoyed. In April, Tacoma, Wash., Tulsa, Okla., Corpus Christi, Texas and New Orleans Chapters had an opportunity to see this film.

The schedule for May and June is:

May 2	Dallas	June 1	Minneapolis
May 10	Rio Grande	June 14	Detroit
May 16	St. Louis	June 22	Green Bay
May 26	Pittsburgh	June 29	Milwaukee

Basic Refrigeration Covers

For preserving the paper bound covers of the new Basic Refrigeration version now being supplied to new members, the Association has been offered detachable hard-bound black covers. These are similar to the type of cover used for telephone directories and may be obtained at $1.50 plus postage. The National Secretary has been authorized to obtain a supply of these covers, provided 100 orders are received from the chapters and members-at-large.

First revival since World War II of an old NAPRE custom has met with considerable success at Chicago. Congratulations to Chicago and Vice-president Bert McKenna for their initiative in playing host, and to the other chapters for participating in the Midwest Educational Conference just concluded. The NAPRE Board of Directors looks for other regions to take their cue from this affair and to hold regional conferences of this sort at opposite halves of our fiscal year from the annual national meeting. The affair there at Chicago was quite impressive, especially the idea of honoring 50-year men in the industry. It may be noted that Pittsburgh could be considered "healthiest" in the United States from their number of eligible 50-year men.

Regis Enbeer

Milwaukee Chapter Presented New Charter

STILL another chapter was added to NAPRE's growing roster Thursday, March 24, when Vice-President Bert C. McKenna presented E. Pat Kelly, President, Milwaukee Chapter, with their charter. Thirty-three new members were initiated by a team from Chicago Chapter, assisted by C. Ward Stoner, the only Milwaukee Charter holder who had been a member previously. First permanent officers were installed by McKenna and the Chicago delegation.

Guest of honor at the affair, attended by wives of the members, was Mrs. H. Gerald Venemann, widow of NAPRE's late Educational Chairman. According to Stoner, Prof. Venemann had been the inspiration of the local group in their Chapter organization, an outgrowth of the 44th NAPRE Convention at Purdue University in 1954. Mrs. Venemann addressed the group briefly and passed the Charter from McKenna to Kelly in the ceremony.

Principal speaker for the dinner presentation at the Astor Hotel, was Karl O. Werwath, President, the Milwaukee School of Engineering, where

Views at presentation of Milwaukee Chapter Charter: Top left—Speakers table, (l to r) L. J. Anderson, E. Pat Kelly, Bert C. McKenna, Frank A. Widmann, Karl O. Werwath, J. Richard Kelahan. Top right: Representative table at the dinner (l to r): Mrs. C. H. Randolph, Mr. Randolph, Mesdames Bert C. McKenna, H. G. Venemann, C. Ward Stoner, L. J. Anderson, E. Pat Kelly, and Stoner. Lower left: Portion of Chicago delegation (l to r): Earl C. McMichael, Bob Kruppe (behind McM.), Eugene Kelly, Nicholas Downes, Mr. & Mrs. John W. Neff, and Mr. & Mrs. Jos. Farrell. Other Chicagoans in attendance besides the National Vice-President and Secretary were J. R. Watson, Erkine Franklin, Art Clementson, Chicago President, and Bob Howe. Karl Schartel of New York was also present. Lower right: Milwaukee entertains Green Bay (l to r): Roscoe Berry, Mr. and Mrs. H. J. Behmke (Behmke back of Roscoe), and Chapter Vice-President and Mrs. John Alberti, all local, with Mr. and Mrs. Harvey A. Wishart, Green Bay. Wishart (partially hidden at rt.) is founder of Green Bay Chapter and represented that group at this charter installation.

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the new chapter makes its headquarters. Chairman of the Committee on Curriculum Development, Technical Institute Division, American Society of Engineering Education, Pres. Werwath outlined the very important and useful part that NAPRE has played and will continue to serve in the training of industry personnel in practical operating details on the job. He particularly cited the need for associations such as NAPRE in other technical fields, to help engineers apply their academic education.

Another speaker was Frank A. Widmann, Milwaukee Association of Commerce. NAPRE's National Secretary, Dick Kelahan, cited Widmann as the man next to Stoner most responsible for the reality of a chapter in Milwaukee. Widmann pledged continued support of the new group and expressed the Association's interest by suggesting a national convention at Milwaukee soon; even to the extent of managing financial assistance to the chapter!

A telegraphic message of congratulations from National President Regis Gubser was read by Chapter Pres. Kelly. Gubser credited Ward Stoner for Milwaukee's first year of activity, and noted that Stoner had first joined NAPRE at Los Angeles in 1930. Chapter officers installed in addition to Kelly were: John Alberte, Vice-president; L. J. Anderson, Secretary; Jack H. Schmidt, Treasurer; C. A. Tondreau, Sergeant-at-Arms, and C. H. Randolph, C. Ward Stoner, Al W. Rohloff and T. B. Graves as Directors. Music and dancing followed.

News Notes and Chapter Activities

New Orleans

MAX SOFER

LOUISIANA Chapter 2 has been increasingly active during March. Brother Marion Olivier, Chairman of Education, arranged a plant visit to the new quarters of the Gulf Refining Co., and for our second meeting offered a lecture by David Bernhardt, Jr., vice-president and general manager, New Orleans Paint and Color Co.

C. B. Gamble, head of the Consulting Engineering firm of Cary B. Gamble and Associates, explained the design of the mechanical installation at the Gulf Refining Co. office building. He highlighted such features as central location of equipment, high velocity air distribution, and a unique 277 Volt System for lighting.

Manager W. D. Holloway and J. E. McConnon, chief engineer of the building, our hosts, then presented an interesting film, describing the design and manufacture of B. and W. boilers. We saw early models of H.R.T. boilers with relatively low pressures and then the present day custom built industrial high pressure water tube boilers producing in excess of one million pounds of super heated steam per hour.

Refreshments were served. Samples of the Gulf Refining Company's fine products were given to the members at the completion of an enjoyable evening.

At our last meeting in March, David Bernhardt, Jr. discussed "Protective Coatings for Maintenance of Buildings". After outlining the subject, he tackled the special problems various members presented for his solution. One of the reasons for the interest was the fact that so many new types of protective materials have been developed and marketed in recent years. These new products which do jobs better, quicker and more economical aroused the members' curiosity.

Mr. Bernhardt invited NAPRE members to make use of his knowledge by calling on him or his organization for any paint problems which may arise. This meeting could have continued until midnight or longer if someone had not called for an adjournment to rescue Mr. Bernhardt from the questions waiting to be asked.

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Los Angeles

FRED HERR

WHENEVER Ralph E. Manns, president, Ralph E. Manns Co., Wilmington, Calif., is scheduled to make an appearance on the educational program of Los Angeles NAPRE Chapter, a capacity audience can be anticipated. The night of March 16 was no exception. Members and guests thronged the Terminal Club auditorium to hear Mr. Manns present a talk on high speed reciprocating and rotary compressors. The talk followed by three years Mr. Manns' address on February 20, 1952, at which time he had discussed the design and operation of high speed compressors, also before a capacity audience. In his '55 presentation, Manns carried the subject of high speed compressors forward to cover developments and techniques of operation that have come into use during the past few years, and discussed at length the factors refrigeration engineers must take into consideration in the maintenance and operation of reciprocating and rotary installations.

During the business session, President Elmer A. Johnson reported the death of chapter honorary member Enos W. Alderman who passed away at the Van Nuys Sanatorium on March 7 at the age of 82. Herbert N. Royden, a long-time friend, reviewed Alderman's career in refrigeration and in the NAPRE. Alderman had been affiliated with NAPRE as far back as three decades ago, having joined Pittsburgh, Pa., Chapter in 1921, the same year that William F. Losch, today's chairman of Los Angeles Chapter's finance committee, became affiliated with the Pittsburgh group. The members paid tribute to Bro. Alderman by standing for a short period of silence.

Chapter President Johnson commented on the role Bro. Royden had undertaken in connection with Alderman's long illness. In 1952, Mr. Herb Royden was appointed guardian of the estate of E. A. Alderman and served his friend in that capacity in the declining years of Mr. Alderman's life. "I feel that we in the NAPRE in general and especially in Los Angeles Chapter owe a sincere vote of thanks to Herb Royden for the aid and comfort that he has bestowed upon our brother."

Among the guests March 16 was Alex Shears, Jr., son of Alexander M. Shears, refrigeration instructor at Los Angeles Trade Technical Junior College. Young Alex also has a career in refrigeration in mind and is doing his studying under Guy R. King, who teaches refrigeration at Santa Monica City College, Santa Monica, Calif. Between his father and Guy, young Alex seems destined to have the advantage of the finest refrigeration instruction available anywhere.

Three new members were enrolled on March 16: Gerald T. Christy, J. E. Benton Co.; J. S. Ellish, Hyde Engineering Co.; and Mel H. Larson, chief engineer, Hollywood Hotel. Mr. Larson's enrollment, according to Membership Chairman Frank G. Muzzy, represents the first hotel refrigeration man enrolled under the chapter's current drive among hotel and restaurant engineers.

Regis Gubser, national president, reported that a move is underway to establish an NAPRE Chapter in Clark County, Nev., of which Las Vegas is the county seat. The many large tourist hotels in Las Vegas, Gubser indicated, each employing a refrigeration engineer, provide a fertile field for prospective members. Lending his influence in the promotion of the proposed new chapter is Tom Russell, Kohlenberger Engineering Co., Fullerton, Calif., who reports a minimum of 20 charter members in sight. Muzzy announced he proposed to visit Las Vegas shortly to do promotion work among Nevada refrigeration men.

Dates for the NAPRE Golf Tournament were announced by V. A. Stubblefield as Sunday, May 29, at the Montebello Country Club, Montebello, Calif. This meeting, March 16, was also highlighted by the showing of Larry Benedict's recent film, "New Orleans Convention, NAPRE, 1954". This film was well received by the membership and should be of interest to all chapters. It shows the departure of Larry and Alma Benedict from Los Angeles, the scenes enroute to Chicago, scenes in Chicago and then the scenes from Chicago to New Orleans. There are several scenes of New Orleans, including the French Quarters. The exhibitor's displays are recorded in this film, colors are very impressive.

Evidence of the planning and effort that has made this film especially interesting is

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the editing and titles. Installation of the National Officers, NAPRE, 1955 was filmed in a group, and then the office, name and chapter was stated followed by an individual picture of each officer. Especially impressive was the appeal that this film expressed for attendance at the forthcoming convention in Los Angeles, November 1955. A hearty "thank you" to Larry Benedict on behalf of the Los Angeles Chapter. (This film will be sent to the local chapters, schedule of which is on the page "From the President's Desk," this issue.)

The educational session of the April 6 meeting featured a talk by Regis Gubser on "Electrical Problems in Refrigeration Plants". Gubser first gave a brief talk on electrical matters in general and then answered a dozen or more questions posed by members. The subject was timely in that the Electrical Maintenance Engineers Association was holding a three-day conference in Los Angeles April 5, 6 and 7, at which Gubser was a principal speaker.

Greater Dade County

CHAS. MONEYPENNY

FOLLOWING presentation of the Charter in February, our chapter has been preoccupied with organizational functions, getting a regular meeting place, going after more members, and shaping up a full-fledged program for 1955. The chapter has a well qualified instructor in member Chas. Haller, but is also investigating an associate for Charles from the University of Miami.

Our group is quite proud of our first instructor. Other members may be interested, since he did not originate in Dade County and has been acquainted in NAPRE circles for some years. Born in Pittsburgh, Mr. Haller was educated there for the field that has been his chief interest for 32 years.

For many years Mr. Haller was employed by the Carrier Corporation, traveling from coast to coast to install their equipment, and it was through this company that he came to Miami, having been sent down in 1947 to install two 500-ton air conditioning units in Burdine's new store. Following this, he installed 400 tons of refrigerating equipment at the pineapple plantation at N. W. 156th street and all of the equipment for National Freezers, Inc., Miami.

Charles W. Haller

Our chapter has acquired a very fine new member in Joseph V. Davidson of Framingham, Mass. and Cincinnati, Ohio. Bro. Davidson retired from his position with the U. S. Army Quartermaster's Research and Development Command on April 1, due to disability. He had been engineer in charge of research on commercial refrigeration items at the Command's Center, Natick, Mass. (see Jan., INDUSTRIAL REFRIGERATION, photo and story, page 21).

Colton

HARRY BONTER

OUR meeting of March 9 was held at the Santa Fe Ice Plant lunchroom San Bernardino. Members voted to donate $25.00 to the Venemann Memorial Education Fund. After business, the meeting was turned over to Frank J. Scherer for his educational class lecture and a discussion on the proper way to circulate cold air in a cold storage room. It was concluded that the best way was to direct the air down to the floor in the aisles and the air would filter its way back through the product stored to the fan suction on opposite sides of the room, the main aisle being across the center of the room and the air going at right angles to the aisle under and through the stacks.

(Continued on page 55)

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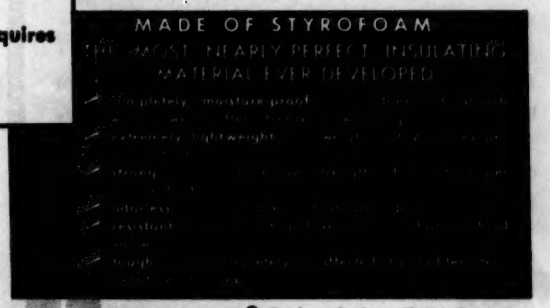
NO ADDITIONAL VAPOR BARRIERS . . .
Maintains Its ORIGINAL INSULATING EFFICIENCY



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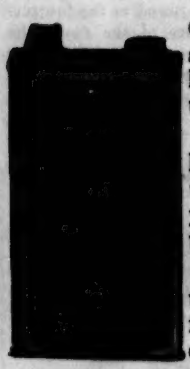

Compressors are running *hotter* and faster than ever before, and heat is the big enemy of unstable oils.

Engineers say this trend to higher operating speeds *and* temperatures started some years ago, and it is expected to continue.

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HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

Frozen Food Warehouse Committee

A REPORT by the Warehousing Committee of the National Frozen Food Packers Association reported substantial progress in meeting some of the very difficult and vexing problems in warehousing frozen foods. It is equally apparent, the report states, that this committee and indeed no committee, can solve these problems once and for all in any short period of time. Inevitably, in dealing with such a wide variety of problems and with such a large number of warehouses, progress has been and in our opinion will continue to be slow. But here is what has been done:

"We have surveyed the membership and identified the most serious problems. These problems have been discussed with warehouse representatives, individually and in groups. As a result, many packers report improvement. Warehouses have speeded up paper work, particularly with respect to withdrawal receipts. Mechanical cars are being unloaded quicker and placed back in service with less delay. And we still hope to succeed in reducing the vast number of varieties of withdrawal receipts now in use to speed up accounting procedures both for us and for warehouses. This will take time, but we are making headway.

"Perhaps most important of all, we have established a close working relationship with the warehouse group. This permits us to conduct full and open discussion of mutual problems, and as time goes on we hope to find that some of our problems are not as insoluble as they sometimes have appeared to be in the past.

"One further point — it is our intention to conduct another "quickie" survey of many NAFFP members regarding their current warehousing problems. Results of this new survey will help the Warehousing Committee to analyze the present situation, determining more exactly where our efforts have been most successful, and where we need to push harder."

Members of the committee are: J. A. Podmore, Chairman, Minute Maid, Plymouth, Florida; A. E. Huff, Birdseye Division, General Foods; Harold Emerson, Seabrook Farms Company, Bridgeton, N. J.

Solar Energy For Air Conditioning

THE use of solar energy for air conditioning is a possibility in India in the not distant future, according to Dr. Bhabha, chairman of the Indian Atomic Energy Commission, at a press conference in New York.

He said that there would be few homes in Indian cities not air-conditioned by this process "just as there are very few homes in the USA without central heating in winter". He said that the solar energy which fell on the terrace of any Bombay building of three and four stories was enough to air-condition all the flats in it.

Dr. Bhabha who is representing India on the Advisors Committee for the International Scientific Conference to be held in Geneva later this year, said India had the requisite technical skill and resources to develop atomic energy for power purposes on her own, but she would welcome assistance as that would help to speed up the progress. He hoped India's first atomic research reactor of "respectable size" would be completed by the end of this year.

Dr. Bhabha said that in his flat in Bombay air-conditioning one of the rooms of about 1,000 sq. feet required about 7 ½ k.w. of electricity. In the tropics, he added, one kilowatt of solar energy fell per square yard. Even with only a 20 percent efficiency it would require only 37 to 40 square yards to air-condition a 1,000 sq.-ft. room.

(*Continued from page* 53)

Memphis

CHAS. CONLEY

THROUGH courtesy of John Thrithart, field engineer, General Electric Co., a plant tour was made on March 16 through the firm's lamp plant where it was seen how electric light globes were assembled, tested, colored, packaged and put ready for the consumer. The machinery that is used in assembling the globes is almost human—the operation has to be seen to be appreciated. Women are mostly used in the operation. The plant employs 600 people on a shift.

F. B. Howell

One of our chapter members recently received a foreign assignment from his firm. Forrest B. Howell, Shift Foreman — Power, The Quaker Oats Company, Chemical Plant organization, is presently on assignment at LaRomana, Dominican Republic. Mr. Howell is assisting the Central Romana By-Products Company in starting up a new power plant at this location. The new plant consists of one 200,000 lbs./hr., 360 psi, 550 F combustion engineering boiler of the high set spreader-stoker type designed for burning three fuels; that is, Bunker C fuel oil, bagasse and furfural residue. Howell departed for this assignment on February 7, 1955 and will be on the location for approximately three months.

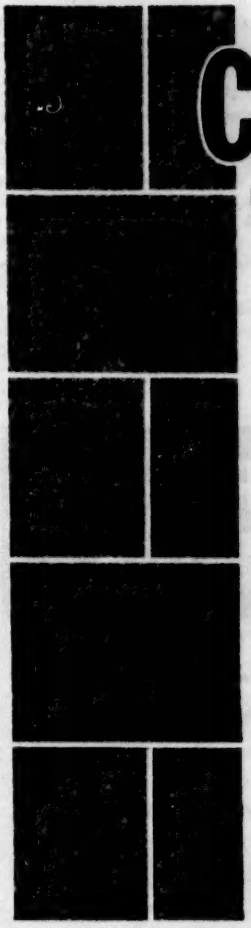
The Quaker Oats Company just completed an installation of new boilers in their Memphis plant. The Company uses corn cobs in the Memphis plant and "Furfural" out of the refuse is burnt under the boilers. Howell has been with them for several years and knows the process so well and the types of boilers they use, that his company loaned him to the Dominican company. This foreign company is going to make the same material out of baggasse, which is a sugar cane.

Texas Coastal Bend

VERNON KUMMEL

OUR meeting of March 4 was called to order by the Secretary in the absence of R. A. O'Neill, President, and Dan Miller, Vice President. A letter was read from the Corpus Christi Engineers Club expressing their thanks for the $50 donation made by the Texas Coastal Bend Chapter for the use of the club's facilities.

Vic Skarke, United Refrigeration Co., introduced the guest speaker, Jim Merrill



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of E. I. Dupont de Nemours & Co., Kinetic Division. Mr. Merrill's subject was "Freon-22". The method of manufacturing "Freon-22" was explained, then a comparison of this and other refrigerants and their properties was made. Special display boards were used to show how a suitable refrigeration system using monochlorodifluoromethane would be designed. Practical uses of this gas, $CHClF_2$, were discussed; such as producing drugs, laboratory uses, air conditioning, etc. Many questions for discussion came up at the end of the program. A small booklet covering the talk was given to each member present.

Seattle

JOHN GRAINGER

ON MARCH 7, Bob Harrison, the chapter instructor, continued with the refrigerating course, his lecture being on the "general principles of mechanical refrigeration". He explained that there are four phases to mechanical refrigeration, (1) through the expansion valve; (2) through the evaporator coils; (3) through the compressor; (4) through the condenser.

Mr. Harrison explained in detail exactly what happened at each phase, the drop in temperature at the expansion valve with the ammonia still a liquid, then the change of state in the evaporator from a liquid to a vapor and the increase of Btu's due to the latent heat of exchange, then the increase of heat in the compressor due to the heat of compression, then the change of state back to a liquid in the condenser due to the heat extracted by the cooling water. Taking 1-lb of ammonia as an example. Bob showed the heat loss and gain at each phase of the cycle, and worked out the weight and volume of the ammonia circulated with the hp required for compression.

The speakers for the evening were Harry Peacor, All-State Welding Alloys Co., and Wayne Shelly, Welders Supply Co., who presented the topic of "Low Temperature Alloys, as Pertaining to Refrigerating". Messrs. Peacor and Shelly spoke on the different methods of stainless steel welding, the necessity of using the same type of welding rod, the type of flux and the method of first "tacking" the parts to be welded, starting at the restricted or inner edge and finishing at the open or outer edge.

They emphasized that the strength of the weld is in the bonding and not in the weld itself. They also spoke on the methods of welding cast iron, i.e. torch weld, arc weld and bronze weld. Bronze weld should not be employed where the weld will come into contact to heat. Factors to consider are the porous nature of the metal and the presence of grease. Surfaces must be clean. The arc weld is done with a nickel rod, 99 percent pure nickel, and the torch weld with a cast rod, heat of fusion not less than 1400 F. The different kinds of flux, temperatures of fusion, kinds of rods, and the kinds of gas used were discussed by the speakers.

A letter from Frank O. Gellert in Vienna, Austria, tells of life there. Anthony Wurzer has returned from a vacation to Vienna and is back at his old job of operating for Diamond Ice Co.

Sacramento

DAN BARTON

ON FEBRUARY 17, the chapter had a surprise visit from National President Regis Gubser. Frank Cordoza, past president at San Francisco, motored Gubser up here between NAPRE and ASRE speaking appearances. The meeting with the President was a luncheon affair, and of necessity brief and lightly attended due to short notice and a working day. The chapter hopes to play full time host at another date.

On March 16 we held an informal meeting at the Sacramento Junior College to try and determine what could be done about reviving attendance. As there was a quorum present, we decided to elect 1955 officers and set a date for future meetings. The officers elected for the year were: Joe A. Fornera, President; W. A. Nichols, Vice-President; Richard E. Stockwell, Education Director and Dan W. Barton, Secretary-Treasurer. The meeting dates were set for the last Wednesday of each month, at Sacramento Junior Col-

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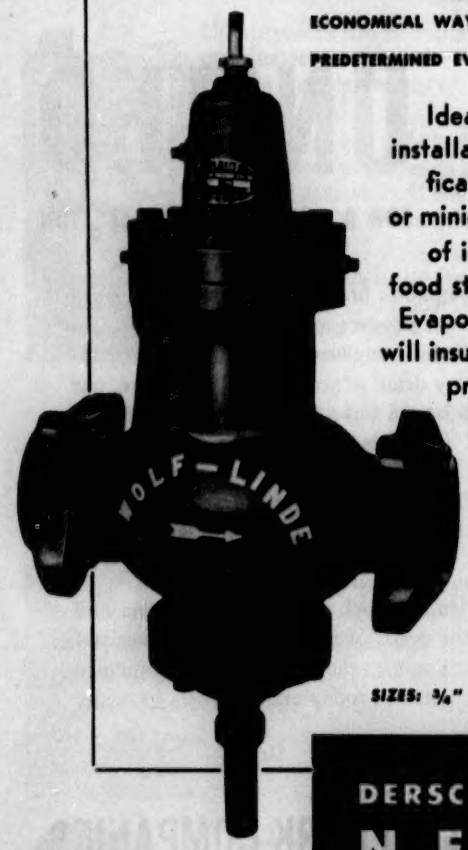

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On March 30 we held our first meeting of the year at 7:30 p.m. with 22 present. As it developed, a good portion of the time was consumed in signing up new members and filling out applications. Dick Stockwell then gave a talk and with diagrams on the blackboard, explained some of the fundamentals of refrigeration. This was followed with a film put out by the Navy on basic refrigeration. The meeting adjourned at 10 p.m. followed by coffee and doughnuts.

San Francisco

HENRY GUILMETTE

NATIONAL President Regis Gubser flew up from Los Angeles in February to fill two speaking engagements in San Francisco. On the 16th, he attended a dinner at the Leopard Cafe in the financial district with Chapter President Howard Boudreau, past president Frank Cordoza, and other members. Following dinner, the party joined other members at the regular meeting hall.

President Gubser presented a talk on "Trends in Warehouse Refrigeration". Because of a short report on affairs of NAPRE, Gubser did not extend his talk with the use of colored slides as planned. The slides were used the following evening with the same talk, which he presented for the local section of ASRE. While the talk itself was interesting from a historical point of view, most of the members were particularly interested in Gubser's comments about frost-heaving of warehouse floors. A lively discussion developed on this subject and numerous means of insulating and venting low temperature floors were pointed out by Gubser and members of the chapter.

Power Group Honors Herzog

Members of NAPRE attended the Engineers' Week testimonial dinner put on by the National Association of Power Engineers on February 24 at the San Francisco Engineers Club. Several members of NAPE were honored, with the highlight of the evening being the "Award of Engineer of the Year" going to long time NAPRE member, John H. Herzog, California No. 1.

Several commentaries were presented by prominent San Francisco citizens, not the least of which was George Christopher, President, San Francisco Board of Supervisors. While all the addresses were outstanding, complimentary, and even humorous, such as the address by Prof. Brown of San Francisco City College, none of them were as timely as the talk of acceptance by Brother Herzog.

John Henry Herzog displayed a few of the reasons which made him an obvious choice for the Award, A long time advocate of improved apprentice training, John stressed the necessity of more progressive thinking on the part of present management and engineers. He pointed out that the atomic age was not a thing of the future but instead was really the age of today, and he cautioned engineers to prepare themselves or be swept aside in this rapidly progressing "Age of the Engineer".

Members-at-Large

BERT C. MCKENNA

IT WAS with regret that we recently learned of the death of Maurice E. Anderson on Christmas morning, aged 48 years. By his sudden death, J. & E. Hall Ltd., London, England, have lost a very valuable member of their staff. He was an Associate member-at-large since 1949.

Mr. Anderson was a senior member at J. & E. Hall where he received the highest respect and affection of the directors and staff. He also had many friends in scientific and engineering circles where his unique ability was always appreciated. He lectured both to J. & E. Hall students in the works, and also in mathematics at the North-West Kent College of Technology.

He was reported by his associates in England to have had a profound knowledge of music, and an unusual ability to pass his knowledge on to others. His services were constantly in demand by all, and no problem ever put to him was beyond the capability of his slide-rule. It was reported he was also of a very kindly disposition and went to a great deal of trouble to explain any problem that was put up to him. He was author of the useful volume "Questions and Answers on Refrigeration", and also a brilliant French scholar.

Another Associate member-at-large lost to our group was James E. Campbell, Pres., Miners Ice and Fuel Company, Joplin, Mo., it was also learned lately, Mr. Campbell died March 17, 1954 in Kansas City, Mo. He had not been feeling well for just a few days prior to his death. He went to Kansas City for a check-up, and while there passed away. It came as quite a surprise to his friends and employees of the company. The cause of his death was due to a hemorrhaging kidney.

Correspondence recently from Chester George and Charles M. Noel, Laramie, Wyo., reminds us that these gentlemen are available to assist H. A. Whitlock and D. Gunnerson in starting up some activity in the Cheyenne-Laramie area. Recent correspondence from H. Dale Young, Salem, G. W. Jeffery, Woodburn and N. J. Fehlen, Stayton, Oregon, prompts a suggestion that they might join forces with G. Towslee, Milton-Freewater and R. B. Ewen, L. I. Mills and Robert F. Wykes, all of Portland, in reviving the Oregon chapter in that locality. Bring in a new member apiece and you will be well on your way.

Pocatello, Idaho has half the minimum required number to start a chapter. Herbert Branham, national director, has R. R. Willicke, Wesley W. Whitney, Guy McMillin and H. A. Shupe in the area. A few hundred miles away at Nampa is Dale Logan and T. T. Lockman. T. Spencer is in Boise. It only takes 10 active members and three meetings a year to hold a charter, fellows.

Down in Tucson, Ariz., our members-at-large may not know that they have a similar situation to Pocatello. W. S. Mason and Alfred G. Hubbard should get acquainted with H. Barrett, S. L. Cordis and J. J. Givens. Again, if each of your gentlemen could interest one more engineer apiece as an active member, you could just about swing a charter. The principal benefits derived from NAPRE membership, come through chapter participation, where members can get-together and discuss mutual engineering problems.

San Jose Chapter please take note! W. F. Lynch and Will C. Presley, two members-at-large in your area have been waiting to be annexed. Welcome these members-at-large to your chapter in 1955 and make them feel at home.

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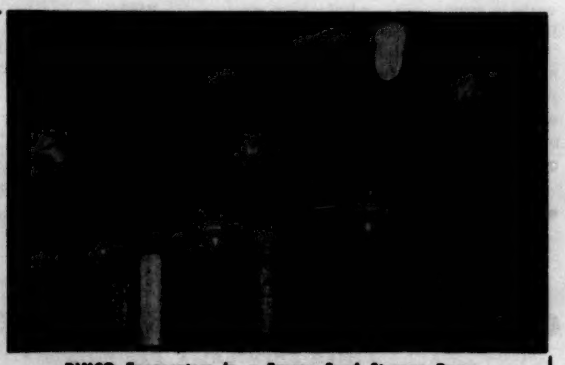

DIMCO Evaporators in a Frozen Food Storage Room at Great Lakes Terminal Warehouse, Toledo, Ohio. A typical installation facilitating palletizing.

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Large Temperature Rise With Freeze Tunnel Water Defrost

QUESTION NO. 1049: Would it be too much trouble to ask you for some information on defrosting units. We use water defrost, and during the running season we have to defrost once or twice a day. Each time we defrost, it brings the temperature up 30 to 40 degrees warmer in the tunnel and we lose too much time in pulling the tunnel down again to 20 to 40 degrees below zero. Could you recommend some other way of defrosting? —W.G., Canada.

ANSWER: I would not want to offer any specific advice in regard to your defrosting problem without having more information about the system. In general, there are four ways of defrosting low temperature installations: Manually, by scraping the ice from the coils; With water, by means of sprays; Electrically, by heating devices built into or under the coils; With hot refrigerant gas, by circulating hot gas through the evaporator.

You could probably adapt some form of hot gas defrost to your system without too much difficulty. As an illustration of how other plant operators have handled this problem, you will be interested in the comments made below.—H. P. Hayes.

In almost any system a measure of defrosting can be accomplished by pumping out the evaporators to a moderately high vacuum, then allowing hot vapor to pass back into the evaporators thru the return pipe by opening by-pass and pumpout valves of the compressor manifold. The vapor enters the evaporators and melts off the frost from one or two pipes, but is often cooled and condensed before any great measure of thawing has been accomplished, especially in those coolers kept at temperatures below the freezing point. By defrosting one evaporator at a time, allowing it to warm up after pumpout and repetition of the procedure several times, fairly clean evaporator pipes may be obtained. At best, however, such procedure is slow. Goods in storage may be damaged by warming up.

Hot vapor defrosting is one of the best methods in use, however, and most refrigeration systems can be adapted to use it. The enclosed diagram shows how this writer once adapted a system to this method at very little cost. The only materials used were a hand expansion valve of ½" pipe size, short pieces of heavy duty ½ inch pipe and one ½ inch stop valve in a by-pass pipe around each evaporator. The hand expansion valve was an old one, and a stop valve was placed in the pipe with it as a measure of precaution against leakage during normal operation. This hand expansion valve was used in a reverse flow liquid pipe line around a liquid receiver. Thru it (during defrosting) liquid was permitted to flow into a shell-tube condenser, which for the time became an evaporator when flow was reversed to cool and condense hot vapor in the cold room evaporators.

This particular system (see figure) operated as follows:

After pumping out the low pressure side of the system by closing valve G, the normal suction and discharge manifold valves of the compressor were closed and by-pass and pumpout valves C and D were opened to permit the compressor to operate with reverse flow. Stop valves E were closed to isolate the thermal expansion valve, and the stop valve F was opened to allow the condensed refrigerant to pass out of the evaporator. All evaporators of this system were bottom fed. This design simplified by-pass piping to drain liquid refrigerant from the evaporator.

To prevent this liquid from draining into the low-set receiver, the stop valve G was left closed, and a stop valve J opened to let the liquid enter a pipe to the equalizer line between the condenser

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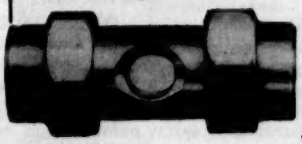

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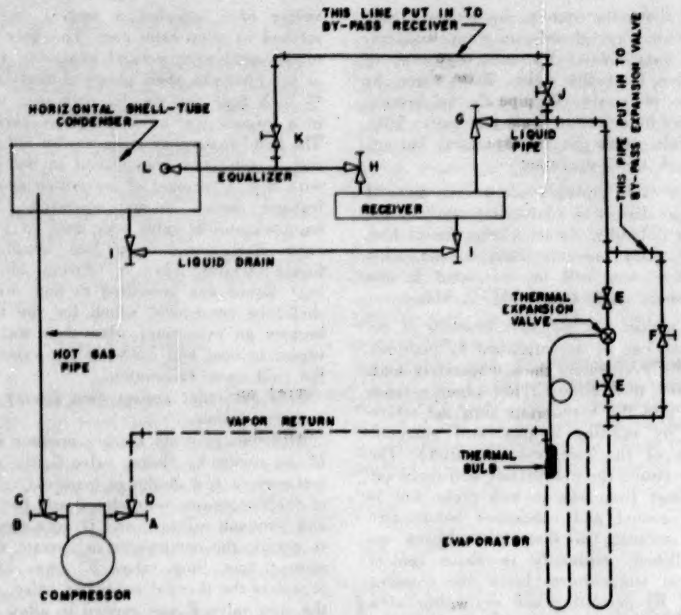

Hot Vapor defrosting system devised by reader

and receiver. Lower equalizer valve H was closed and upper equalizer valve L left open. After the compressor has been started, the expansion valve K is opened to admit liquid and permit the condenser to act as an evaporator.

The whole idea is to reverse places with condenser and evaporators. It is, of course, quite necessary to keep water flowing thru the condenser to supply heat for evaporating the refrigerant and eventually passing via the hot vapor to thaw the frost from the evaporators. Pressures, too, must be watched closely during reverse flow, to prevent the possible leakage of refrigerant, or even rupture of low pressure piping.

The expansion valve must be set carefully to prevent possible flooding back to the compressor thru the usually short (normal) hot vapor pipe. Also, abnormal cooling of the condenser may cause leaks to develop at gasketed flange pipe joints, rolled ends of condenser tubes, or even at litharge-sealed threaded pipe joints. *Defrosting by hot vapor requires extreme caution!*—O.L.B., Oroville, Wash.

Reducing Delivery Pressures In High Velocity Air System

QUESTION NO. 1050: Describe how 5-inch static pressure is reduced to 1½-inch static pressure at delivery in high velocity air conditioning systems.—E. McM., Chicago, Ill.

ANSWER: Pressure is reduced by an adjustable butterfly valve at the entrance to the sound absorption chamber of the outlet. It is usually reduced considerably below 1.5 inch (H_2O) static pressure since the diffuser is usually similar to that used for a low pressure system.—N.S., San Luis Obispo.

Queries Operating Practice With Unit Air Condensers

QUESTION NO. 1051: The article, "Air Cooled Condensers Cut Down on Costs of Maintaining Cooling Towers", in the January issue of Industrial Refrigeration has raised a point which needs clarification. The article states that the head pressures never went below 100 pounds during the past winter, although outside temperatures were as low as 15 F. I know they are small units but I have had a lot of experience in this and winter pressures should be very much lower if he used water. We all know that the closer the evaporator and condenser pressures are together, the less power required per ton of refrigeration. Were the summer pressures unusually high?—M.J., Baltimore, Md.

ANSWER: In the installation described, the air cooled condensers have been sized so as to maintain a condensing temperature from 105 to 110F at 90F summer air temperatures. On days when the air temperature exceeded 90F, the condensing temperature rose accordingly; for instance, on a 95F day, the condensing temperature would be 110 to 115F. Under no conditions would the head pressure exceed a safe level for the compressor served.

Very roughly, an air cooled condenser will operate at a constant temperature difference between air and refrigerant if the rate of loading is approximately constant. In other words, if this temperature difference during the summer was 20F, it will tend to remain the same during the winter. Therefore, when the air temperature is 15F, the condenser would operate at 35F condensing temperature. This, of course, is undesirable because the thermostatic expansion valves would not properly feed unless the valve inlet pressure is 100 PSI or higher. In order to maintain the necessary head pressure during the winter, the manufacturer has introduced the "Winterstat," which is a pressure operated valve installed in a bypass in parallel to the condenser. See article and Fig. 6, page 18, March 1955, I.R.—O.J.N., Trenton, N. J.

Proper Solder Selection

QUESTION NO. 1052: A leaky joint has developed in a 2⅛ inch bypass from a Hubbell capacity control off our "Freon" compressor. Fire regulations at utility firm for which I work won't allow large enough torch tips to attain silver-solder heat range. Will 95-5 solder hold? Or will oxidation cause the joint to give out in a short time?—S.M., Chicago, Ill.

(*Continued on page* 68)

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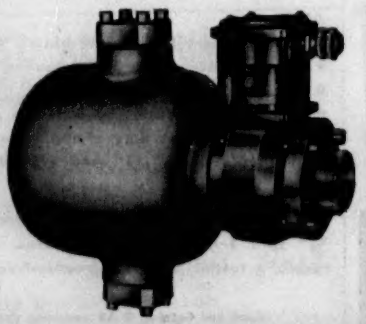

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Swanson and Campbell Soup Affiliation

PLANS to affiliate through an exchange of stock have been announced by Campbell Soup Company, Camden, N. J. and C. A. Swanson & Sons, Omaha, Nebr. Under the agreement Campbell would acquire all outstanding stock of the Swanson company in exchange for Campbell stock.

Campbell is a major producer of canned and frozen soups and other processed food products. It came into partial public ownership last winter. Its sales for the fiscal year ended July 31, 1954 totaled $338 million dollars. Swanson is a leading producer of poultry products and frozen prepared dinners and other frozen specialites. Its stock is closely held.

Affiliation of the two concerns would put under one management ten Swanson food processing plants and nine Campbell soup plants in the United States and Canada. Campbell has about 13,500 year-round employees and Swanson 4,100.

The joint announcement by Gilbert Swanson, chairman, and Clarke Swanson, president of Swanson and by William B. Murphy, president of Campbell Soup, said Swanson products would continue to be marketed under the Swanson label. The statement indicated Swanson's major future emphasis would be in the field of precooked frozen foods.

Mr. Murhpy said "The changing pattern of living and eating habits makes the market for frozen foods, and especially frozen pre-cooked meals, very attractive. Swanson has an excellent name, a skilled and experienced management team, and an established position in its field. This affiliation will bring to Campbell an experienced organization for the manufacture and marketing of frozen food specialties which we believe will prove highly beneficial to our future."

Campbell began marketing frozen soups in 1954 and now is experimenting with other frozen products. It is undergoing major plant expansion, with emphasis on frozen soup facilities.

The Swanson organization was built under the leadership of Carl A. Swanson who became a partner of the company in 1900 when it was known as the Jerpe Commission Company. By the 1930's the company claimed to be the largest carload shipper of live and dressed poultry. It took its present name in 1945 and the following year for the first time began selling nationally advertised products under its own brand name.

Refrigeration Promotes Extensive Use of Farm Products

RESEARCH by the U.S. Department of Agriculture, including extensive use of refrigeration, has put millions of dollars of extra money into farmers' pockets by expanding the outlet for agricultural commodities, the annual Farm & Home Weeks meeting was told here.

Frank L. Teuton of the Agriculture Department's Service said "in the food field more than half of last year's Florida orange crop went into fresh-tasting frozen orange juice concentrate we developed."

People in the audience sampled apples stored for several months in air-tight, refrigerated "modified atmosphere storage rooms" pioneered by Cornell University and said the apples tasted "as good as those off the trees in the Fall."

The audience also was asked to distinguish between freshcut flowers and those preserved for five weeks by a new method of cold storage holding, another Cornell research project.

DOUBLE SERVICE

PROMPT DELIVERY of a reliable product is always desirable. And when delivery and reliability are backed up by both your local dealer and a nationwide service force, your service is *doubly good.*

THIS IS WHAT you get when you order Barrett Brand Anhydrous Ammonia. Not only do you get a product made by America's largest producer of high-purity, extra-dry Ammonia, but you get service from a local distributor.

YOUR LOCAL DISTRIBUTOR is an independent firm whose livelihood depends on his personal service to you, backed by the staff, experience and facilities of Nitrogen Division. He can help you solve any technical problems you may have. He will also provide you with the type of service you want. Call him today!

BARRETT BRAND Anhydrous Ammonia is available in 150, 100, and 50-lb. cylinders. If you use bulk quantities, your local dealer will arrange for shipment in tank cars.

First in Ammonia Since 1890

NITROGEN DIVISION
ALLIED CHEMICAL & DYE CORPORATION
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Hopewell, Va. • Ironton, Ohio • Orange, Tex. Omaha, Neb.

Prevent
COLD ROOM LOSS

with . . .

AIR-LEC DOOR OPERATORS

Air-Lec, shown installed above the cooler door, opens and closes the heaviest doors quickly, safely and smoothly at the touch of a switch or the light pull of a cord. Available with Mechanical Trip for one or two operating stations above each door approach, or with Electrical Switch for more and distant stations. Air-Lecs are in use in thousands of factories, food freezing and storage plants, meat packing companies, garages and service stations.

Speed and Safety are characteristic of Air-Lec because Air-Inertia-Spring, all elastic forces, are the patented forces used.

AIR-LEC FOR TYPICAL COOLER DOOR. . **$65.00**

. . . AND AIR SEAL

Installed at left of door in illustration, the Air Seal operates in conjunction with Air-Lec, to provide an absolute seal on cooler doors. Air Seal crowds the outer edge of the door to stop improper circulation and frosting. Air Seal is especially desirable where temperatures below freezing are maintained.

AIR-SEAL. $25.00

NOTE HOW THEY RE-ORDERED AIR-LECS

	Recently Ordered	Now Enjoy
Pan-Am Foods, Inc. Brownsville, Texas	2	10
Arizona Cold Storage, Inc. Phoenix, Ariz.	2	15
National Freezers, Inc. Miami, Fla.	1	4
Farmers Storage Co., Inc. Moorestown, N. J.	2	5

Fill in and return the coupon today for complete information.

SCHOELKOPF MFG. CO., Madison, Wis.

Cooler Doors are ____ Ft. Wide, ____ Ft. High. Air Pressure ____

Open Toward Warm Side, Cold Side.

Firm Name .....

Address .....

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312 N. THIRD ST., MADISON 4, WIS.

Review of Government Activities Affecting Warehousing

A COMPLETE review of legislative and other government activities affecting the refrigerated warehousing industry is provided in a "Quick-Sheet" issued by the National Association of Refrigerated Warehouses.

On April 6 the Senate Small Business Sub-Committee under chairmanship of Senator Thye held a special session to hear progress reports from the Department of Defense and Budget Bureau on their activities to terminate competitive activities. This question has been referred to the Legal Monetary Affairs Committee on Government Operations. This committee will be assigned any legislation introduced in this category.

It appears almost a certainty that sections 452 (deferment of prepaid income) and 462 (reserves for estimated expenses) of the 1954 Internal Revenue Code will be retroactively repealed. H.R. 4725 to accomplish this repeal has already passed the House and is now awaiting action in the Senate Finance Committee. The Association has protested repeal of these sections in a telegram to Senator Bryd and the members of his Finance Committee. The telegram was forwarded to Treasury Secretary Humphrey who advised that the tax loss from these sections is so much greater than originally thought that the Treasury cannot afford the loss. "Outright repeal, despite its bad effects, seems to be the only way to correct the situation", he said. He pointed out, however, that the matter will continue to be studied and if another way can be found to secure the original desirable purposes without the accompanying bad results appropriate legislation will be recommended.

Among bills recently introduced H.R. 4793 would "provide tax equity" by taxing cooperative corporations and provides "tax credits" for recipients of dividends from genuine cooperatives. Specifically, the bill would tax cooperatives at the corporation level and would give farmers a dollar tax credit for every dollar paid by the corporation. The bill has a possibility of passage providing the Treasury Department recommends it.

The House Agricultural Committee has begun hearings on H.R. 2815 to authorize the Commodity Credit Corporation to process food commodities for home or institutional use.

Minimum Wages

A Senate Labor Sub-Committee, chairmanned by Senator Douglas, began hearings April 14 on the more than 50 bills which have been introduced to increase the minimum wage and otherwise amend the Fair Labor Standards Act. (NARW will file a brief opposing any increase in the minimum wage or extension or coverage). There is an increasing feeling that a compromise of $1.00 per hour may be reached on the minimum wage increase, particularly since the Administration is reported to be modifying its position with regard to extension coverage.

Another reported development is the possibility of a deal between the advocates of an increased minimum wage and the 90 percent of parity group by which each group will support the other in trying to get bills through Congress.

Other observers see little chance of any minimum wage legislation this year because an increase next year just before elections would be more advantageous politically and because both the House and Senate Labor Committees are headed by southerners whose business

constituents are most opposed to a minimum wage increase.

The Supreme Court has ruled that guards and watchmen and related clerical employees servicing the warehouses of a chain store organization are subject to the Wage and Hour Law. The decision held that such personnel are subject to the Act even though they do not physically handle merchandise and even though they are employed by a separately incorporated detective or watchman agency.

Right to Work

Status of the right to work laws in the various states are as follows: Massachusetts—bill defeated by vote of 190—2. Maryland—defeated 70—41. West Virginia—Bill died in House Labor Committee when legislature adjourned. Tennessee—Senate tabled a bill to repeal the law. Reports are that labor leaders will attempt to get right to work law repealed. Alabama—Alabama State Federation of Labor is planning to launch a drive for repeal of right to work law. Michigan—A bill declaring it to be against public policy to make employment Contingent upon union membership has been introduced, but is given little chance of passage. Indiana—Right to Work bill died in Committee when legislature adjourned. Ohio—Proposed bill given little chance of getting out of Committee. Wisconsin—Right to work moves appear dead for this session. Missouri—A bill calling for submission of Right to Work issue to the people in November 1956 has been introduced. Hearings now being held. Kansas—Right to Work measure passed, but vetoed by governor. Attempt to override failed by six votes. Iowa—A move to repeal the law has been defeated. Nevada—a proposal to kill Right to Work law goes on November 1956 ballot. Colorado—Bill in Senate Labor Committee with small chance of being reported out. Utah—Became 18th state to adopt a Right to Work law.

Over-Production of Heavy Turkeys

PRODUCERS of heavy breed turkeys have been urged by the United States Department of Agriculture to hold their 1955 production at levels below 1954. A marked increase in the setting of eggs from heavy breed turkeys over last year was noted today by officials of the Department of Agriculture. Reports received by the Agricultural Marketing Service from 11 important turkey states show that in the four weeks prior to April 1 eggs set in incubators were up seven percent from a year ago. With this prospect for a record large April hatch, the total hatch of heavy breeds from January through April is estimated at only five percent below the corresponding period a year ago. Continued heavy settings during the next few weeks could bring the May hatch also to a record level.

Although about five percent more heavy breed turkey breeder hens were on farms January 1 than a year earlier, the big decrease in the hatch through March confirmed reports that owners of breeding flocks were managing their hens so as to defer the peak production of eggs until relatively late in the season.

The potential egg supply for heavy-breed poult production from May through the end of the hatching season is unusually large as a result of the larger number of breeder hens on farms this year and the later season for turkey egg production. Therefore, this production could result in a record or overlarge output after May 1 unless egg settings are held down. In view of this situation, producers should take a careful look at their production plans for the balance of the year, the Department said.

When it's a question of new refrigeration coils, it's no time to speculate on dependability or to compromise on quality. And where it's a question of assuring efficient, uninterrupted operation and low maintenance throughout the years—

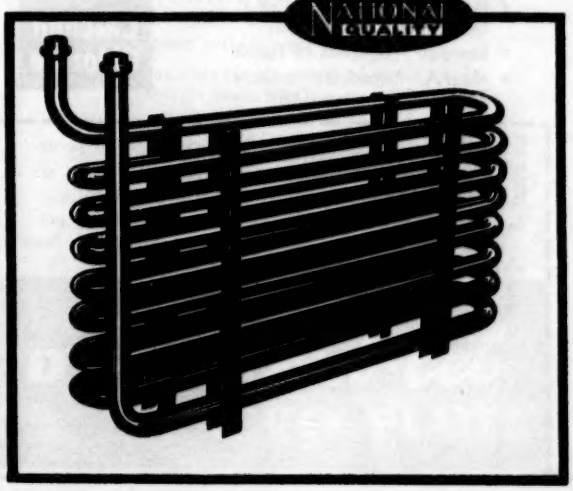
NATIONAL
REFRIGERATION COILS

offer you the benefits of over 70 years' specialization in the pipe-bending field: experienced engineering and exact production, with smooth bends, perfect welds, and accurate measurements.

Whenever you need coils, write for our free tracing-chart which shows standard dimensions ready to fill in. It will simplify your specifications—whether for zig-zag or nested box or conical or round-flat or reducing coils.

NATIONAL PIPE BENDING COMPANY
162 RIVER STREET • NEW HAVEN, CONN.

Established 1883



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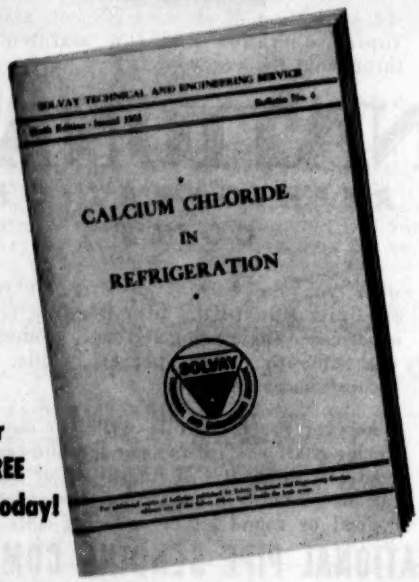

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Engineers Joint Council Elects ASRE as Associate

ENGINEERS Joint Council has announced at its headquarters in New York the election of The American Society of Refrigerating Engineers as a constituent society. Is also annuonced the election of the American Institute of Industrial Enginers as an associate, the first organization to become an EJC associate.

EJC now has nine constituent societies with a total membership of more than 196,000. Other organizations in EJC are American Society of Civil Enginers, American Institute of Mining and Metallurgical Engineers, The American Society of Mechanical Engineers, American Water Works Association, American Institute of Electrical Engineers, The Society of Naval Architects and Marine Engineers, American Society for Engineering Education and American Institute of Chemical Engineering.

Objectives of EJC are the advancement of the general welfare of mankind through the available resources and creative ability of the engineering profession; cooperation among the branches of the profession; advancement of the science and profession of engineering; development of sound public policies in national and international affairs wherein the profession can be helpful through the services of members of the profession.

EJC has been taking steps toward increasing the unity of the enginering profession. A total membership of at least 5,000 is required of a national organization to qualify for constituent membership. The American Society of Refrigerating Engineers, which has headquarters in New York City, has more than 6,200 members. A recent constitutional amendment permits EJC to admit as Associates national organizations of less than 5,000 members. The American Institute of Industrial Enginers has some 3,000 members. Its headquarters are in Columbus, Ohio.

Thorndike Saville, Dean of the College of Engineering, New York University, is President of EJC.

EJC is sponsor of a Nuclear Congress of Engineering and Science to be held in Cleveland, Dec. 11-17, 1955, with twenty-three national organizations participating.

Cold Storage Research Advisory Committee

AT THE recent meeting of the Cold Storage Research Advisory Committee, Paul B. Christensen, Portland, Me., was re-elected chairman and H. C. Diehl, Colorado Springs, Colo., was re-elected vice chairman. Numerous recommendations were made including a repeat of a former recommendation suggesting that State and Federal research workers confer with industry executives and research leaders on problems of common interest before initiating research affecting industrial fields.—NARW Cold Facts.

Irradiation of Foods May Be Harmful

IN A recent report to the American Chemical Society, Samuel A. Goldblith and Bernard E. Proctor of the Food Technology Department of the Massachusetts Institute of Technology warned that food sterilized by atomic radiation for preservation might be harmful if eaten. They said that subtle changes in a relatively few molecules of a food or drug subjected to radiation could result in products harmful to the consumers. The scientists agree that the biggest problem facing commercial radiation is eliminating production of the undersirable side effects.—NARW Cold Facts.

Delta States Ice Association Holds Spring Meetings

AT THE meetings of Delta States Ice Association in Grenada, Miss. March 20 and the one in Monroe, La. on April 6, membership interest and participation was at a peak. Modern trends in mechandising ice was the main topic of discussion. It was developed that with the ever increasing cost of labor, vendors would be the main salvation of the ice industry, along with self-service freezers placed in carefully selected locations, such as groceries, drive-in markets. etc.

Various methods of delivering bagged ice to vending stations were outlined; some were utilizing refrigerated trucks where they had several vendors to keep loaded, while others made their deliveries via regular trucks, covering the load with cold, quilted tarpaulins. Tieing, stapling, taping and sewing were all being used to close the bags. Amount of ice in the different priced packages also came in for a generous share of attention. Many were of the opinion that the price of 25 cents for a 12½ to 14 pounds bag was the most popular setup.

At the Louisiana meeting a representative from National Rejectors, Inc. gave a practical demonstration on how to operate and service the three types of coin mechanisms being utilized on ice vending stations at the present time. It was revealed that there is still some produce icing going on in the Delta area, but to no marked degree; the same holds true for meat and poultry icing.

An increase in advertising is evident, including media of newspapers, radio and TV, with radio and TV spot announcements becoming more prevalent. One of the members, in addition to present TV spot flashes, will soon again start a series of 15 minute weekly TV programs to run through the entire ice season. Their experience last year proved that this type of advertising, though expensive, really paid off.

A number of successfully tried ideas were set forth to bring in additional revenue and it was generally agreed that the ice men in the section would do well to utilize every available asset in this direction. Why miss any bets to keep on the black side of the ledger during the lean months for ice sales?

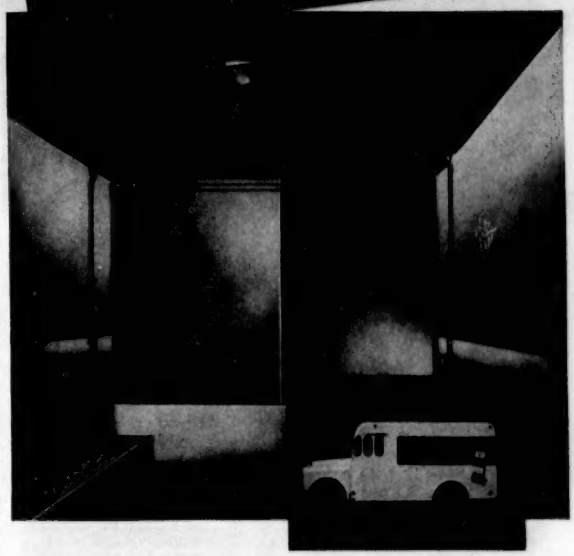
Among other subjects discussed were automatic controls in the ice plant, reduction of manufacturing cost, high cost of present day delivery, Wage-Hour Law, how to increase sales to your customers and secure new ones, and economic outlook for the remainder of 1955.

Changes in Egg Products Inspection

A REVISION of regulations governing the voluntary egg products inspection program has been announced by the U. S. Department of Agriculture. The changes modify slightly the processing requirements for the preparation of frozen egg mixes and blends which have salt, sugar, and other stabilizing ingredients added. The inspection mark is changed by the addition of the letters "USDA" in the uppermost portion of the shield design of official identification. This is expected to aid in preventing unauthorized use of the official inspection mark.

The revision also brings the regulations, minimum sanitary requirements, and processing instructions together in a single publication and results in a reorganization of the format similar to that contained in the regulations for shell egg and poultry grading and inspection. Some provisions of the regulations are revised to make them consistent with similar provisions of the shell egg and poultry programs.

For constant, dependable temperature control install *Cold-Cel* TRUCK PLATES



Engineered to Maintain Any Temperature Required Throughout The Trip!

In sizes to fit any application. May be installed in a horizontal position suspended from the ceiling, in a vertical position along the walls, or as a partition. Can carry eutectic solutions ranging from −59° to +26°.

In standard thicknesses and connections: 4-Connection 2⅛" and 2⅜"; 3-Connection 1½"; 2-Connection 1".

DOLE REFRIGERATING COMPANY
5938 NORTH PULASKI ROAD, CHICAGO 30, ILLINOIS
103 PARK AVENUE, NEW YORK 17, N. Y.
In Canada: Dole Refrigerating Products Limited
44 Elgin Street, Brantford, Ontario

Write for "Cold-Cels in Action" — a pictorial brochure — or Engineering Catalog CE.

Maximum Refrigeration Efficiency DOLE THE *Cel* LINE

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EXTRA LARGE

Capacity...

THERMOBANK

for Freon and Ammonia

NOW...no job is too large for the KRAMER THERMOBANK

The only completely automatic system for freezing temperatures offering these extra large capacities. THERMOBANK requires no manual attention whatsoever.

Ceiling mounted, THERMOBANK takes no precious floor space. You can store products directly under the unit.

Can be used as an independent system or with an existing large system without affecting the operation of other evaporators.

WRITE FOR BULLETIN TA249-F

KRAMER TRENTON CO.
Trenton 5, N.J.

Government Dairy Purchases Decreased

THE U.S. Department of Agriculture reports that during the 1954-55 marketing year, butter purchases by the Commodity Credit Corporation were down 45 percent from the previous marekting year, cheese purchases were down 66 percent, and nonfat dry milk purchases down 21 percent. Purchases for the 1954-55 marketing year amounted to 210.7 million pounds of butter, 153.3 million pounds of cheese, and 523.2 million pounds of nonfat dry milk compared with purchases under the higher support level during the previous 1953-54 marketing year of 380.2 million pounds of butter, 452.4 million pounds of cheese, and 665.8 million pounds of nonfat dry milk. USDA officials pointed out that dairy support purchases were heavy in March 1954, at the end of the 1953-54 marketing year, as the trade reduced its inventory to a minimum prior to the reduction in purchase prices on April 1, 1954.

During the 12 months of the 1954-55 marketing year, the movement out of CCC inventories was stepped up considerably and 1,666.5 million pounds of the three dairy products moved into channels of use, largely for welfare use at home and abroad. This was more than three times the 493.6 million pounds moved during the previous 12-month period (April 1, 1953—March 31, 1954). This heavy movement out of CCC stocks combined with the reduced purchasing resulted in a substantial decrease in the uncommitted supplies of dairy products on March 31, 1955 as compared with those on March 31, 1954. Butter shows a decrease of 35 percent, cheese 30 percent, and nonfat dry milk 85 percent from uncommitted supplies on March 31, 1954.

In March 1955, purchases amounted to 17,260,833 pounds of butter, 10,183,189 pounds of cheese, and 37,133,796 pounds of nonfat dry milk. These compare with purchases of 86,184,624 pound of butter, 178,030, 368 pounds of cheese, and 129,214,461 pounds of nonfat dry milk in March 1954 when purchases were extremely heavy because of the changeover to a lower support level on April 1, 1955. In continuing the support prices in effect during the past 12 months for another year, the severe inventory adjustments of a year and two years ago were avoided. During March 1955, sales and scheduled distribution provided an outlet for 33,293, 177 pounds of butter, 14,617, 267 pounds of cheese, and 32,353,079 pounds of nonfat dry milk.

Fiberboard Cartons for Shipping Lettuce

SUBSTANTIAL savings are being realized by shippers in California and Arizona by dry-packing lettuce in fiberboard cartons in the field or packing sheds and vacuum-cooling it for shipments, as compared with ice-packing in WGA wooden crates in packing sheds, the U.S. Department of Agriculture has announced in a bulletin on the subject.

This finding was made in a study by the Department in cooperation with the Western Growers Association in the 1952-53 lettuce harvests in certain areas of California and Arizona. Net savings from the use of the new packaging method amounted to $80 per car on lettuce vacuum-precooled and shipped from the Imperial Valley to New York City. When cartons dry-packed in the field were cooled in the refrigerator car with car fans and bunker ice, the comparable savings amounted to $150 per car, although this method appeared to be practicable only for shipments from the desert areas where early morning field temperatures at time of harvest are low.

Fluorescent Lighting For Cold Storage Rooms

AT THE recent meeting of TRRF's Scientific Advisory Council in Chicago, D. W. Rowten of Westinghouse Corp. presented a final report on a short-term project on fluorescent lighting. In this study, National Terminals Corp. and Westinghouse cooperated. Lighting equipment was studied and tested in the National Terminals Plant in Cleveland in both cooler and freezer rooms (as low as minus 30 F) and with varying requirements such as 5 to 10 foot candles in storage rooms and 25 to 35 foot candles in break-up and meat packingrooms.

A new lamp intended for street lighting along with standard fluorescent lamps were tested. For temperatures above 32 F, standard fluorescent either bare or protected in conventional luminaires can be used. For temperatures near minus 5 to 0 F, the new rapid-start 100-watt cold-temperature lamp will perform satisfactorily either bare or in a protective enclosure (plastic). For minus 30 to minus 5 F, best results will be obtained with the rapid-start lamp with an enclosure.

Engineers attending the Chicago meeting agreed that while savings in general storage rooms are not highly significant, they can be important in rooms of larger requirements such as break-up rooms. Thus the advantages for fluorescent lights, such as lower operating, maintenance and refrigeration — load costs (in spite of higher installation cost), can be realized with the new lamps. Those planning new warehouse construction will be interested, but modification of existing plants, especially multi-story buildings, may not offer a particularly favorable prospect because of difficulties in modifying wiring and outlets already in place.—TRRF Bulletin.

Frozen Food Associations Elect

AT the recent frozen food convention, the National Association of Frozen Food Packers elected G. L. Mentley, president; F. G. Lamb first vice-president; and Sterling Doughty, second vice-president. The Distributors Association elected Sam Vogel, president; Al Ris, eastern vice-president; Clyde Barrington, southern vice-president; Archie Huss, central vice-president; Frank Hicks, southwestern vice-president; Harold Hacke, western vice-president; Carlton Eacho, secretary and Howard Jester, treasurer.

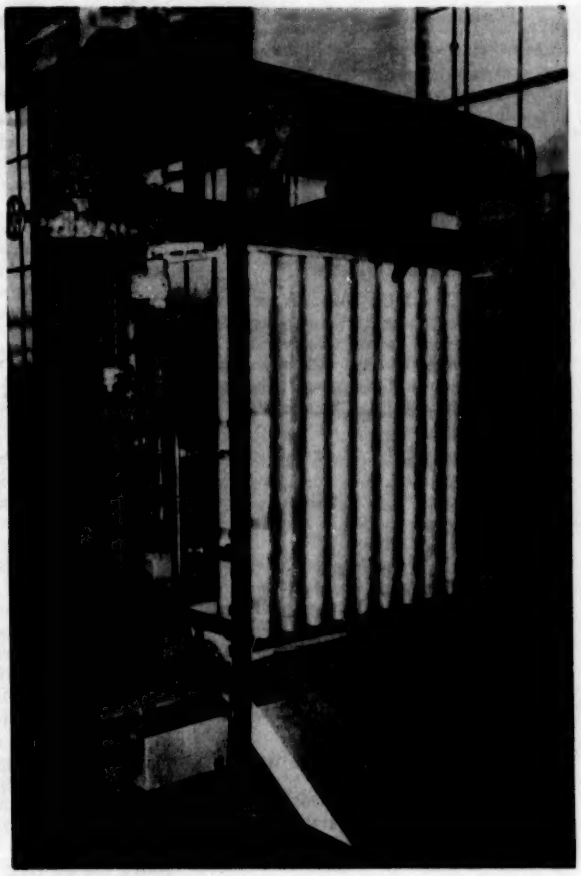
COMING CONVENTIONS

CANADIAN WAREHOUSEMENS ASSOCIATION
June 20-23, 1955
Banff Springs Hotel, Banff, Canada
H. CECIL RHODES, Executive Secretary

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 8-10, 1955
Ambassador Hotel, Los Angeles, Calif.
RICHARD J. KELAHAN, Secretary

NATIONAL ASSOCIATION OF ICE INDUSTRIES
November 15-18, 1955
Biltmore Hotel, Los Angeles, Calif.
GUY W. JACOBS, Exec-Secy.

AIR CONDITIONING and REFRIGERATION EXHIBIT
November 28 through December 1, 1955
Atlantic City Exhibition Hall, Atlantic City, N. J.



Harvest New Profits with a FRICK SHELL-ICE MAKER

Ideal for dairies, fisheries, poultry and vegetable packing houses, hotels, institutions, industrial plants, etc. Shell-Ice is frozen on vertical tubes by direct-expansion ammonia or Freon, in thicknesses of 1/8" to 1/2", and is broken by spinners to size desired. No snow, scrapings or waste: no scale, no cleaning. Shell-Ice is dry and hard, and with average good water is clear. This ice-maker is fast, efficient and automatic. All-steel construction: no delicate parts. Requires very small floor space. Sizes 1/2 to 40 tons capacity. Dozens already in service. Write for Bulletin 54.

DEPENDABLE REFRIGERATION SINCE 1853
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

(Continued from page 60)

ANSWER: No trouble should be caused by oxidation. If excessive vibration is present at the joint the solder may become crystallized and the joint give way in time. If excessive vibration is not present, no trouble will be experienced. Many systems installed with 95-5 solder have been in operation for more than twenty years without difficulty.—N.S., San Luis Obispo.

Oil Slugging Problems

QUESTION NO. 1053: With low pressure refrigerants, will oil slugging from the system occur mostly with a cold compressor — say with start-up? Will excessive oil slugging bend or warp a shaft?—A.D., Chicago, Ill.

ANSWER: Slugging is more apt to occur at start up than at any other time. Oil slugging may bend the crank-shaft or damage the compressor discharge valves. Slugging may be caused by:

1. Any type of pocket in the suction line in which the refrigerant-oil mixture may collect during shut-down periods.
2. Drainage of refrigerant-oil mixture into the head of a compressor from a long discharge line during shut-down periods.
3. Excessive oil in the system.
4. Improper adjustment or leakage of the expansion valves.
5. Leakage of liquid line solenoid valves during shut-down periods.

Of course, no single remedy can be stated. Assuming proper operation of the solenoid valves and expansion valves, the operation of a system having long refrigerant lines can be greatly improved by using discharge line oil traps. There will be much less oil in the system and most of the oil will be in its proper place.

One practice is to trap long suction lines just ahead of the compressor, and drive off condensed refrigerant with a heater.

Often the electrical connections are so arranged as to effect an automatic pump-down of the low-side. After the solenoids are closed and the fans stopped one compressor continues to run until the low side is pumped down nearly to atmospheric pressure. The circuit is arranged so that no compressor starts again until refrigeration is demanded.—N.S., San Luis Obispo.

New Questions

Differential Pressure Drop Due To Gear Pump Wear?

QUESTION NO. 1054: We have two Flakice machines which operate on the recirculating ammonia principle. The ammonia pumps are rated as having a capacity of 35 gpm at 20 psi differential. However, our differential pressure has now dropped to 5 psi. Could it be from the gears wearing at the sides? What clearance should these gears have?—G.C., Nova Scotia.

Cylinder Scoring Problem

QUESTION NO. 1055: In my refrigeration plant I have several VSA machines taking suction from rotary boosters and discharging to an evaporative condenser on the roof. For two years now I have experienced no trouble with these machines. Suddenly I noticed scoring in the cylinders. I have checked against contamination, wear from the rings and possibly faulty valves, but have not located the trouble. We re-bored one machine and ran it six hours without the heads with plenty of oil topping. After replacing the heads we ran the machine for six hours and then opened it for inspection. The scoring had taken place all over again. One practical engineer has suggested that I leave the oil ring off. Another has suggested that I chamfer 1/64 inch off the top and more off the bottom of all rings above the oil ring. Could you give me a few hints or suggestions as to what might be causing this scoring? I believe that I can take it from there.—J.A.F., Chicago.

Finned-Pipe Manufacturing

QUESTION NO. 1056: Large industrial finned pipe coil has involved me in several arguments as to how the fins are put on. I understand some are aluminum and are cast on, while others are steel and shrunk in place. Recently I learned that some of these fins are put on pipe by using oil pressure within the pipe. In other words, this party contended that some 4,000 pounds of oil pressure belled or ballooned the pipe to the shoulder of the fins. Do you know of this practice? If so, would it have any advantages? It seems to me that 4,000 pounds of pressure would tend to weaken the pipe wall and raise some doubt in my mind as to the longevity of the pipe. —A.D., Chicago.

Wants Bread Freezing Data

QUESTION NO. 1057: Would it be too much trouble for you to give me some particulars on the freezing and thawing of bread? The information I would like is the temperature of the bread entering and leaving the freezer, time in the freezer, the temperature of air, and in the thawing side — the method used, temperature and time taken. Is any special product formula followed?—R.F. Glasgow, Scotland.

Asks Coloring For Water Ice to Detect Subsidized Competition

QUESTION NO. 1058: Currently, we are producing ice for sale to the general public as well as the fishing industry. However, through Government Regulations, we supply the fishing industry with ice at half the cost of which it is sold to the general public. This is done with the object of assisting the fishermen by keeping the cost of ice sold to them at the lowest possible figure.

The ice that is produced for sale to fishermen is frosted, while ice that we sell to the general public is clear. We have observed that the frosted ice which is sold to the fishermen, and which we expect only to be used in the fishing industry, is being sold to the general public by these same fishermen.

We find it difficult to know exactly how much ice a fisherman really utilizes, and as a result of this, he has the opportunity to over purchase and is able to sell at competitive price with us to the general public. We should like to color the ice which is presently being sold to the fishermen, and would ask your advice on this matter.—J.M.F., Georgetown, British Guiana.

WAKE UP SLUGGISH EVAPORATORS WITH A

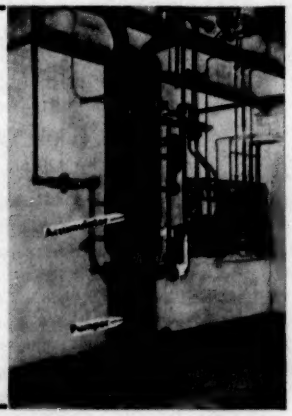
Watkins RECIRCULATOR

(PATENTED)

● TIME TO INSTALL a Watkins! Forces all evaporators to maximum efficiency with complete full-flooding. Refrigerant drives through the coil, washing out oil, thus giving maximum heat transfer. Watkins recirculates excess cold liquid to evaporators; protects compressor from slugs; permits fast hot-gas defrosting. No need for mechanical pumps or surge drums. THREE-YEAR WARRANTY ON ALL PARTS EXCEPT INDICATOR BULBS.

Write for Bulletin and Prices

J. E. WATKINS CO.—307-A LAKE ST.—MAYWOOD, ILLINOIS



News of People

Strong New Vice-President City Products Corp.

THE election of Harry E. Strong of Memphis, Tenn., as a vice-president of City Products Corporation is announced by William J. Sinek, president. Mr. Strong is president and chief operating officer of the Midwest Dairy Products Corporation, a wholly-owned subsidiary of the parent company, with headquarters in Memphis, Tenn. The headquarters of the dairy division has been moved to Memphis to afford closer contact with the southern operations.

Mr. Strong has been associated with City Products Corporation since its inception into this diversification. He is an experienced dairy executive of ability, technical training, and practical knowledge. He began his career after completing his education at the Case School of Applied Science, Cleveland, Ohio, and has made dairy industry his major work. He has increased the scope of the operations by additional purchase and expansion of present properties, including the creation of a special products division which is engaged in research and production of special products sold to the dairy industry at large. He is a past president of the Illinois Dairy Association; for many years a director of the International Ice Cream Manufacturers Association, a member of its public relations committee and International Ice Cream Merchandising Institute.

The dairy division operates throughout the south embracing Tennessee, Illinois, Missouri, Indiana, Kentucky, Mississippi, Louisiana, Arkansas, Oklahoma, Texas and Iowa, Nebraska and S. Dakota.

FRED ALFORD, president of The Alford Refrigerated Warehouses, Dallas, Tex., recently placed fourth in the International Skeet Shooting Championship in the Olympia International in Mexico City. Mr. Alford's score was 196 out of a possible 200. The championship score was 198.

A. E. HUFF, of Birdseye, well known to refrigerated warehousemen, will retire from the organization as manager of Warehousing and Transportation. He is being succeeded by Richard (Dick) Gelin, who will assume that title.

Dr. H. C. (Dutch) Diehl, director of The Refrigeration Research Foundation has accepted appointment on the Food & Drug Administration-Civil Defense Foods Advisory Committee. The Chairman of this Committee is Dr. Roy C. Newton of Swift and Company; Dr. Frank Gunderson is Secretary, and it is set up in the Division of Biology and Agriculture of the National Research Council in Washington, D.C.

JOHN F. CAUSEY, Hollywood, Fla., has been appointed credit officer of the Hollywood Federal Savings and Loan Association. Mr. Causey has been connected with the City Products Corp., Miami, and in 1942-43 served as president of The Florida Ice Association.

Florida Ice Plant Sold

THE Crestview (Fla.) ice plant has been purchased by Kahn Messick, Laurel Hill groceryman and wholesale meat dealer. The new owner plans to enlarge the plant and complete facilities started several months ago to enlarge the service. Former owner was Mrs. Bessie Rice Outlaw Houck.

Here's how to sell more ice--better service

Snow-icing with a LINK-BELT Ice Crusher-Slinger opens new markets for you!

YOUR profits go up when you offer shippers snow-icing service with a Link-Belt Ice Crusher-Slinger. It's the superior way to lay a uniformly protective blanket of ice over entire shipments of perishable products—in trucks or railroad cars. What's more, it assures shippers that their products will arrive at the market at the peak of flavor—demand top prices.

Link-Belt Ice Crusher-Slingers are available in either stationary or portable types with gasoline engines or electric motors. Capacities from 15 to 60 tons per hour. If you want to build profits in the ice service business, ask your nearest Link-Belt office about the Ice Crusher-Slinger. Or write for Book 2382.

LINK-BELT

ICE CRUSHER-SLINGERS

13.435

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

DEATHS

James Gallup

THE death of James Gallup 78, retired chief engineer, Railways Ice & Service Co., died at his home in Kansas City, March 22. Mr. Gallup was born at Hutchinson, Kans., and had been a resident of Kansas City, Kansas, 42 years. He had been employed by the Railways Ice & Service Co., principally in engineering duties, starting with the organization at Newton, Kansas in 1903. He had served at the Clovis and Belem, New Mexico plants, transferring to the Argentine Station at Kansas City in 1913. He retired in 1944.

Surviving are his wife, Mrs. Katherine Gallup, two daughters, three sons and a sister. Services were from Simmons chapel.

ROBERT J. QUINN, 65, sales executive for Mathieson Alkili, now Olin-Mathieson Chemical Company, died recently. In 1953 he retired in Tucson, Arizona for reasons of health. Mr. Quinn held many honors in chemical and engineering circles and was recognized as an authority on anhydrous ammonia and chlorine.

VICTOR HAMMOND of Kosciusko, Miss., died recently. He was one of the few remaining pioneers in the ice industry. In 1896, then 22 years old, he joined his father and two brothers in organizing the Kosciusko Ice and Coal Company, which started selling "Northern Ice" which had been harvested and shipped from the North. At that time ice was used only in drug stores, by doctors for the ill, and by the very rich.

DAVID SCHENCK JACOBS, oldest living past president of the American Society of Refrigerating Engineers, died Friday February 11 at his home in Montclair N. J. He was 93. Mr. Schenck was retired chief engineer of Babcock & Wilcox Company. He was president of ASRE in 1907.

SAMUEL W. HUNTOON, East Orange, N.J., who operated a wholesale ice company for 25 years in New York, died April 15 at his home after a long illness. He was 80. He was president of the former Huntoon Ice Co., New York, which he founded in 1903 and operated until he sold the business in 1928. He also was president many years of the Ice Publicity Association of New York.

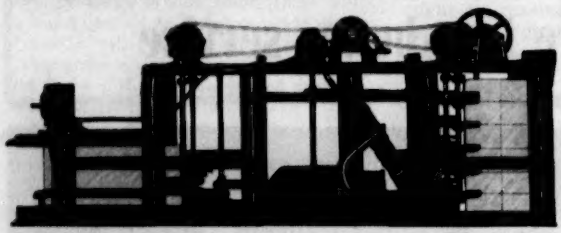
Exposition of Power and Mechanical Engineering

THE Chicago Exposition of Power and Mechanical Engineering will be held in the Chicago Coliseum, November 14 to 18, under the auspices of the American Society of Mechanical Engineers and in conjunction with their 75th anniversary meeting. Space reservations are already being made for the display, which will be located only a short distance from the hotels where the ASME meetings will be held. The exposition will be under the management of the International Exposition Co., 480 Lexington Avenue, New York 17.

Fruits and Vegetables Freeze Damage

AGRICULTURAL Marketing Service reports that record breaking low temperatures in the South Central and Southeastern States on March 26 and 27 caused extensive damage to early season fruits and vegetables. Below freezing temperatures occurred as far south as Central Texas and Northern Florida. The peach crop was hit hardest, with Georgia, South Carolina, North Carolina, reporting total losses.

PERFECTION SPECIAL



The PERFECTION SPECIAL receives ice blocks on edge, scores them lengthwise first. Then heads up the blocks, scores them crosswise and discharges them standing on end. This is a combined heading and scoring machine and scores the blocks into any size pieces desired in one complete operation. Capacity is 4½ blocks per minute or 270 blocks per hour.

ICE-A-TERIA
Ice Vendors For Every Requirement.
Ice-A-Teria will vend block or bag ice 24 hours a day for those extra SALES! Write for full information.

PERFECTION ICE SCORING MACHINE CO.
P.O. Box 2140, Fort Worth, Texas

A Handy Tool - WRIGHT'S HEAD-BACK PRESSURE CALCULATOR

Actual Size 3½ in. square

The Head-Back Pressure Calculator quickly determines the proper head pressure, for various refrigerants when the suction pressure, room temperature or mean water temperature is known.

Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all enter in determining the proper head pressure.

Post Paid $1.00

NICKERSON & COLLINS COMPANY
433 N. Waller Ave. CHICAGO 44, ILL.

MANUFACTURERS' NEWS

Reid Named to Fiberglas Sales Builders' Club

THE appoinment of Robert T. Reid to the 1955 Sales Builders' Club of Owens Corning Fiberglas Corp., for outstanding sales achievements during 1954, has been

Robert T. Reid

announced by Harold Boeschenstein, Owens-Corning president, who said the purpose of the club is to give recognition to those salesmen in the branch offices whose efforts prove outstanding each year. The club indicates the 18 top salesmen in the United States.

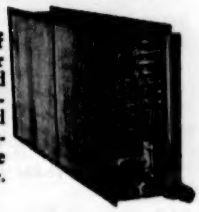
A member of the Fiberglas organization since 1936, Mr. Reid has been with the Minneapolis office since March, 1952. Previous to that he was at Owens-Corning's plant in Newark, O. During World War II he served with the U. S. Air Force in the Pacific area. He is a native of Baltimore, Md., and a graduate of St. Francis de Sales High School in Newark, O. He is a member of the National Association of Practical Refrigerating Engineers.

Court Holds Ice Making Machines Infringe Patents

A DECISION by Judge Murphy of the U. S. District Court in San Francisco has held that the ice making machines manufactured by Liquid Freeze Corporation infringe Patent No. 2,310,468. This decision was rendered in a suit brought against Liquid Freeze by Flakice Corporation, the owner of the patent, and York Corporation, the licensee. The machines which were held to infringe the patent are those manufactured by Liquid Freeze and sold by it and Ajax Corporation. Judge Murphy held the wedge principle of the patent is new and novel and has great practical value.

HEAT TRANSFER EQUIPMENT
REMPE CO.
Founded 1890

PIPE COILS—FIN COILS
FOR REFRIGERATION, AIR CONDITIONING, HEATING



Coils and Bends of any Metal, Size or Design. Engineered to your requirements. Designed and built for longest life and the least maintenance.

Send your problems to us for engineering assistance.

REMPE COMPANY
348 N. Sacramento Blvd., Chicago 12, Ill.

Our neighbors didn't like us . . . until we bought an ARMSTRONG PURGER

Gentlemen:

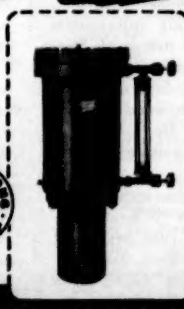
We used to have hand run purgers. These would fill up and run over, losing a lot of ammonia. Our head pressure would be up and down. At times we would have to shut the engine room down and purge from the top of the condensers and lose a lot of ammonia. Our neighbors did not like this.

Now we have an Armstrong purger and our troubles have ceased.

Chief Engineer
____ Ice Cream Co.
Detroit, Michigan*

* Name on Request

You won't smell up the neighborhood when you have an Armstrong Purger. It gets *all* the non-condensibles out of your refrigerant system with *negligible refrigerant loss.* Head pressures remain within a few pounds of theoretical. Bulletin No. 221, gives full facts. Send for your copy.



ARMSTRONG MACHINE WORKS
860 Maple St., Three Rivers, Mich.

ARMSTRONG FORGED STEEL PURGERS

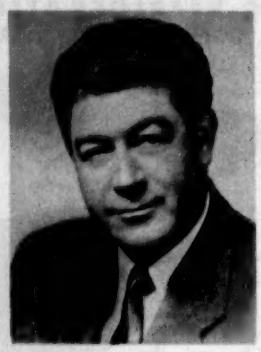
Bateman's New Low-Cost
ROYAL
Model 50
ICE CRUSHER

Operates on a ½ HP., motor. Grinds 50 lbs. in 30 seconds. Makes a very good fine ice. Has all fine teeth for making the small ice that is so much in demand. Grate adjustable by turning handle on side of crusher.
Chute for filling bags. Gears are encased in gear box and run in grease. Shelf to place ice on before entering hopper. Guard covers flywheel. Will take a regular 50 lb. block of ice. Shaft is moulded into the drum. Galvanized for the prevention of rust. Priced at $250.00 with motor. $185.00 less motor. Belt & pulley furnished. All steel shell, grate handle and legs. Semi-Steel drum and grate.

Bateman Write For Full Information
Ice Processing Equipment
MINERAL WELLS, TEXAS

Dow New Sales Engineer For Mojonnier Bros.

THE appointment of John Dow to Sacramento, California, as sales engineer has been announced by Majonnier Bros. Co., Chicago, manufacturers of refrigeration equipment. Mr. Dow will cover the northwest Pacific territory, including Utah,



John Dow

Idaho, Oregon, Washington, Wyoming and British Columbia, Canada. His engineering experience, covering a ten year span, was gained primarily in the west coast region. His familiarity with this part of the country, coupled with his excellent background and demonstrated ability should provide much valuable help to the growing list of Mojonnier customers in this area.

Vending Machines Installed

THE S & S Vending Machine Company reports the following installations of ice vending equipment.

Richmond Ice Co., Richmond, Va., two 8 x 20.

Home Ice Co., Petersburg, Va., two 8 x 16.

Richland Springs, Richland, Texas, one 8 x 16.

Wallace Ice Service, Danville, Illinois, three 8 x 16.

Pure Ice Co., Berlin, Conn., two 6 x 10.

Burnside Ice, Berlin, Conn., one 6 x 10.

Ottens Harbor, Wildwood, N.J., one 6 x 10.

Friedrich Ice, Wrightstown, N.J., one 8 x 16.

Superior Distributing, Gettysburg, Pa., one 8 x 20.

Varnar Ice, Fairborn, Ohio, one 8 x 16.

Springbrook Ice & Fuel, Berlin, Pa., one 6 x 10.

Moore Ice Service, Salt Lake City, Utah, three 8 x 16.

Woods Ice, Oakhurst, Calif., one 6 x 10.

City Ice Delivery, Wichita, Kans., two 9 x 24.

Jensen Ice Co., Ogden, Utah, one 8 x 16.

David Ice & Fuel, Jacksonville, Fla., three 9 x 16.

Buchta Ice, Guilford, Conn., one 9 x 16.

Chalfont Beverage Co., Chalfont, Pa., one 8 x 16.

Lincoln Ice Co., Concord, N.Y., one 8 x 20.

Inland Service, Crozet, Va., one 8 x 16.

Fiberglas to be Marketed By Armstrong

THE FULL line of Fiberglas industrial insulations made by the Owens-Corning Fiberglas Corporation will also be produced for the Armstrong Cork Company which will market them under the trade name, Armaglas, it has been announced jointly by H. R. Peck, vice-president and general manager of Armstrong's Building Materials Operations, and by E. J. Detgen, vice-president of Owens-Corning.

The arrangement was entered into by Armstrong in order to take advantage of the unusual properties of Fiberglas industrial insulations and thus serve its customers more effectively; and by Owens-Corning to make its materials more readily available to an increasing number of users. While basically the Armaglas products will be the same as those marketed by Owens-Corning, the firm has agreed to manufacture the Armaglas materials to Armstrong's specifications.

Peterson Joins Sales Staff Kramer Trenton

ANNOUNCEMENT is made by S. Charles Segal, general sales manager of the Kramer Trenton Co., Trenton, N. J. that Hans P. Peterson, former chief engineer of the Bush Manufacturing Co., has joined the sales staff of Kramer. He will cover the North Jersey territory.

Hans P. Peterson

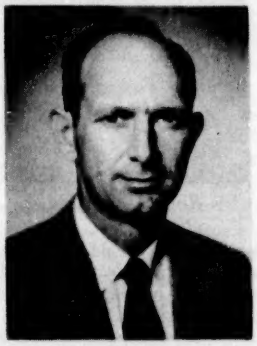
A former resident of West Hartford, Conn., Mr. Peterson now resides in Maplewood, N. J. He is a member of the American Society of Refrigeration Engineers and a registered professional engineer, holding patents on aircraft intercoolers and defrosting systems. A native of Sweden, where he attended primary schools, Peterson received his secondary education in Hartford, Conn., and attended Worcester Polytechnic Institute. He received a BS in chemical engineering from Worcester.

From 1938 until 1947 he served with the Bush Manufacturing Co. of West Hartford as chief engineer. In 1948 he joined the Cecil Boling Co. (now Bush Manufacturing and Heat-X-Changer Co.) as a representative for the Philadelphia territory, and in 1952 he resumed his duties as chief engineer for the Bush Co.

During the war Peterson developed supercharger intercoolers for Navy aircraft and designed cooling units for military food storage purposes. After the war he directed the design of unit coolers, heavy duty units, evaporative condensers and packaged air conditioners and refrigeration units. He served on the standards committee of the American Society of Refrigeration Engineers.

Payne New Houston Manager For Creamery Package

THE promotion of John H. Payne to manager of the Houston, Texas, branch of The Creamery Package Mfg. Company, was recently announced by James L. Brazee, vice-president. Mr. Payne first joined Creamery Package in 1948 as a salesman



John H. Payne

for the Houston branch. He was successively promoted to sales engineer in 1952, and to assistant manager and then acting manager in 1954. During this time he has become a well known figure among Texas dairymen, forming many valuable business acquaintances.

Australian Subsidiary Formed by Caterpillar

THE formation of Caterpillar of Australia Pty. Ltd., a wholly-owned subsidiary, has been announced by H. S. Eberhard, president of Caterpillar Tractor Co. The subsidiary, third foreign company formed by Caterpillar since 1950, will manufacture and sell many of the regular products now built by the parent company, as well as a line of replacement parts for the entire line of Caterpillar products.

Caterpillar's other foreign subsidiaries are Caterpillar Tractor Co. Ltd., organized in England in 1950, and Caterpillar Brasil S. A. — Maquinas e Pecas, formed in Brazil in November, 1954.

The company has purchased 100 acres of land just outside of Melbourne and will start construction as soon as possible on a 100,000 square-foot building. In addition to its own manufacturing, the subsidiary will import Caterpillar machines and parts from the parent company and its other subsidiaries, and will buy parts from Australian vendors.

CATALOGS AND BULLETINS

New Automatic Expansion Valve Catalog

A NEW 6-page 2-color combined catalog listing all automatic expansion valves has been issued by the A-P Controls Corp. The new design will enable users to determine the size of valve they require, and to see the entire A-P range of automatic expansion valves available. This makes ordering easier. This is not a condensed catalog but covers all product design features and mechanical data in a complete comprehensive form.

Fourteen models of valves with nominal capacity of ½ to 1¾ ton are listed along with schematic views. Engineering data on all factors important to the application of automatic expansion valves is listed. Also covered is how-to-select information and a complete description of slotted orifice type valves.

New Bulletin on Flexible Nylon Pressure Tubing

FLEXIBLE nylon pressure tubing is described in a new product bulletin issued by The Polymer Corporation of Pennsylvania, Reading, Pa. Outlined uses of the tubing, called Nylaflow, include air lines, process lines, coolant lines, fuel and oil lines, lubricant lines and hydraulic lines. Complete information is provided on the material's advantages, characteristics and properties. Important cost and installation data rounds out the product description. Illustrations accompany the engineering information throughout. Sizes and lengths of available tubing are also given.

Sporlan Valve Issues Illustrated Talks

TWO new educational talks using a variety of colored slides have been released by the Sporlan Valve Company. These lectures, for presentation by Sporlan's field representatives, are now available to technical and educational societies, manufacturer's, wholesaler's, contractor's, and service organizations.

One of the new presentations covers thermostatic expansion valves; their theory of operation, and application.

The second of the new talks titled, "Moisture, Inc.", deals with the effects of moisture, stability of refrigerant-oil mixtures, formation of acids, and the performance of desiccants. This talk is interesting, highly informative, and topical since the problem of moisture in refrigeration systems is of major importance in the Industry.

These colored slide talks have been developed in such a way as to make them appealing to the technical engineer, the serviceman, and the layman.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings; $15.00 per inch for line listings.

Positions and Help Wanted

WANTED—Excellent opportunity for experienced man in rapidly expanding field. Cold Storage insulation Sales Engineer experienced in take-off, design assistance and execution of cold storage contracts, to manage cold storage department of Mid-West contracting division of national inorganic insulation manufacturer. Write, giving complete details of past experience. Box MY-9, c/o Industrial Refrigeration.

SALES REPRESENTATIVES WANTED

Well established manufacturer of compressor parts has several openings for qualified Sales Engineers in various locations in USA.

Our product sells where compressors are in operation. If you are already calling on the Ice, Cold Storage, Brewing, Oil, Gas and Chemical industries and are able and willing to take on an additional line, we can offer an excellent future. Travel and hard work are a requirement. Compensation — liberal commissions.

Please send resume with background and previous sales experience. All replies held strictly confidential. Box MY-3, c/o INDUSTRIAL REFRIGERATION.

ICE PLANTS—for sale

FOR SALE—Ice Plant, capacity 40 tons per day; machinery complete. Call 255-M Stuart, or write R. E. Luckhardt, R. R. 1, Stuart, Florida.

FOR SALE—Going Ice Plant with extra large building and three lots. Trucks, crusher and slinger. On main highway for trucks. Write Box MY-7, c/o Industrial Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—One 15 ton Ice Plant. 10" x 7" Worthington booster. 12 ton shell & tube condenser. 3x3, 5x5, 8x8, 9x9 Yorks. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

USED EQUIPMENT—wanted & for sale

FOR SALE—Boston type ice tongs, $6.00 per dozen; also some chain tongs. Government surplus. Gordon Equipment Co., 6530 W. Jefferson Detroit 17, Mich.

WANTED—Ice cans 11" x 22" x 51" x 52 over-all height. Preferably in York 16 groups with three lifting pins. Will buy up to 70 groups. State age and condition. The M. J. Uline Co., 3rd & M St. N.E. Washington 2, D.C.

For Sale

10x10 York direct to 125 h.p. 360 r.p.m. motor.
10x10 York direct to Unaflow Steam engine.
9x9 York direct to 75 h.p. 360 r.p.m. motor.
9x9 Frick V-belt drive.
7¼ x 7¼ Baker V-belt drive.
5x5 York V-belt drive 20 h.p. motor.
Uline ice scoring machine — new 1947
130 h.p. Superior Diesel engine 600 r.p.m.
2—18"x18' enclosed condensers with receivers.
Type 50 F&E cuber; 15 & 10 h.p. Freon condensing units; ice cans; blowers, etc.
Enclosed shell & tube brine cooler 5 pass 228—2" tubes 16' long. Chester Jensen cooler 100 ton cap.

JOHN F. CARSON
"A" & Venango Sts. Philadelphia 34, Pa.
GArfield 6-2221

WANTED—Used ice cans 11x22x45" outside; used ice slinger; used sizing and bagging equipment, small, Harrison"s Ice & Locker Plant, Gregory, So. Dak.

FOR SALE—Late model Frick 6x6 with motor and vee belts, also 7½x7½, 8x8, 9x9, 10x10, ice plants, cans, cranes, agitators, blowers, Diesels. Parke Pettegrew, 370 West Broad St., Columbus 8, Ohio.

FOR SALE—USED ICE PLANTS & REFRIGERATING EQUIPMENT

Complete Ice Plants 20 to 100 Tons
Ammonia Compressors, 5" x 5" to 12½" x 14½"
Condensers, Cranes, Blowers, Scoring Machines, Ice Canes—Various sizes. 100# — 300# Ice Cubers.
Write or wire us on any equipment you may need.

ENTERPRISE EQUIPMENT CORPORATION
77-79 Alexander Street, Yonkers, New York
Cable Add.: ENEQCO Ph.: Yonkers 8-8118-9

FOR SALE

1—30 h.p. York 6 cyl. 3¾x3 compressor, base and flywheel.
1—15 h.p. 3 cyl. York 4x4 compressor motor unit.
1—Schnacke 20-25 h.p. unused compressor motor unit.
1—7G8 Carrier 60 h.p. compressor unit 50% unloading device.
1—50 h.p. Chrysler compressor motor unit with new compressors.
1—15 h.p. Chrysler Airtemp compressor motor unit with new compressor.
1—20 h.p. Westinghouse condensing unit.
1—20 ton Westinghouse water chiller.
1—20 ton 6 row coil, Westinghouse air handling unit, with heating coil.
All Freon equipment in good condition — guaranteed-no reasonable offer refused.

MARC AIR CONDITIONING & REFN. CORP.
360-362 Broadway Brooklyn 11, N.Y.

FOR SALE—2 high speed 8x8 York ammonia compressors complete with motors and V belts. Write P.O. Box 1093, New Haven, Conn.

FOR SALE—York Flakeice machines, 2, new, in original crates, large capacity. Complete with 15 h.p. and 25 h.p. motors. Write P.O. Box 8139, Philadelphia 3, Penna. Attn. Mr. H. W. Brennan.

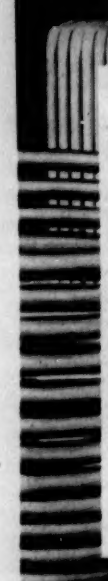
FOR SALE—500 ton refrigeration equipment for ice stadium or enterprise demanding big tonnage; excellent condition, genuine bargain. Born Company, 80 East Jackson Blvd., Chicago 4, Ill. WAbash 2-3299.

LIQUIDATING TENNESSEE BREWERY MEMPHIS, TENN.

$1,000,000 of new equipment installed 1948. York 11½x10 compressor, 108 tons cap., 175 h.p., 369 r.p.m., 220 volt, new 1949. York 2-stage liquid ammonia pump, 50 h.p. 2 ammonia receivers, new 1949. York gas separator, York 150 ton 2-cylinder ammonia compressor connected to Corliss steam engine; York 20 ton refrigeration unit, new 1946, #10415, 15 h.p. motor, self-contained, cooling tower, double pipe brine cooler, 10 stands, 12 pipes high, 18' long; York double pipe ammonia condenser, 8 stands, 12 pipes high, 17'6" long; York double pipe ammonia condenser 14 stands, 12 pipes high, 17' 1" long; one 10 ton refrigeration unit, Freon; one Curtiss 5 ton air conditioning unit; "Combustion Engineering Company" 400 h.p. boilers, installed new 1944, 203-3½" tubes, 170 PSI 3933 sq. ft. ASME, firebox rebuilt for oil and gas in 1944; one boiler same as above except new in 1940, firebox rebuilt for oil and gas 1949; thousands of feet of 2" and 3" ammonia pipe and coils, motors, blowers; all types of equipment. Inspection invited. Subject to prior sale. For details write exclusive liquidating agents.

CHARLES S. JACOBOWITZ CORPORATION
3080 Main St. Buffalo 14, N.Y.
Telephone AMherst 2100 — Cable "JACO"

PIPE BENDING EXPERTS



Coils, Headers, Fabrications

Completely modern metalworking machines plus over 36 years of "know-how", assure the finest work to your exact specifications. Proven specialists in custom bending in any form any metal, even stainless steel.

May we quote on your next job?

CHICAGO NIPPLE MANUFACTURING CO.
1997 CLYBOURN · CHICAGO 14

FRED OPHULS & ASSOCIATES

Consulting Engineers

112-114 West 42nd St. New York City 36

Industrial Power Plants
Refrigeration and
Cold Storage Warehouses,
Reports, Appraisals and Management

VAN RENSSELAER H. GREENE

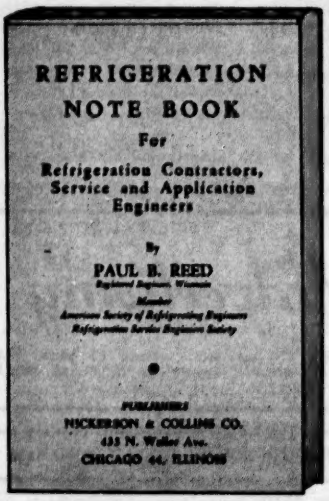
ENGINEERS

COMPLETE PLANT DESIGNS INCLUDING BUILDING AND EQUIPMENT

11 PARK PLACE NEW YORK 7, N. Y.

A Vest Pocket Book of Valuable Data REFRIGERATION NOTE BOOK

by PAUL B. REED



Vest Pocket Size—3¼ x 5 Inches
204 Pages—Flexible Binding

THIS NOTE BOOK of condensed refrigeration information represents many years of work in accumulating practical data—"culling out" all extraneous material—so as the author states, "the reader will find a handy and easily carried source of information not usually kept in memory."

You will be surprised at the wealth of material that has been included in this convenient and practical reference Note Book. It is written in layman's language, without complicated formulas. In short, it is a tool responsible for the operation of refrigeration equipment.

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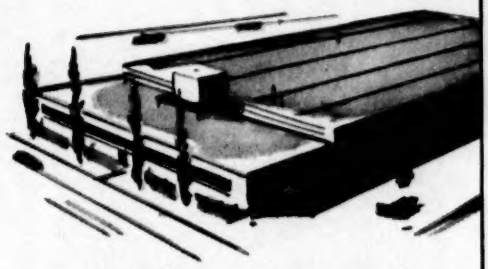


MID-SOUTH REFRIGERATED WAREHOUSE COMPANY
One of the largest cold storage warehouses in the country! Capacity: 20,000,000 lbs. Operated at minus 10° F.—minus 20° F. for quick freezing.

MID-SOUTH REFRIGERATED WAREHOUSE COMPANY

Phone 62-1611 ☆ P O Box 3926 ☆ 1100 East Parkway South

MEMPHIS 14, TENNESSEE

December 29, 1954

Mr. Allen W. Cox, Manager
Low Temperature Insulation Sales
Owens-Corning Fiberglas Corporation
Toledo 1, Ohio

Dear Mr. Cox:

It has now been almost two years since the completion of the installation of your Fiberglas Cold Storage insulation materials in our new $2,000,000, minus 10° F. freezer plant in Memphis, Tennessee. As you know, over 60 carloads of Fiberglas were used in this building.

You will recall that this cold storage plant contains over 1,000,000 cubic feet of sub-zero refrigerated space, that we normally run at about minus 10° F., and that can be brought down to below minus 20° F., for quick freezing, when needed. We have a capacity of about 20,000,000 pounds of frozen food, with in and out handling facilities to move around 100 tons through the warehouse each day.

Through our associated Memphis Cold Storage Warehouse Company, we have been in the cold storage business in Memphis for about 50 years and have never previously used Fiberglas insulation. In fact, Charles Conley, our Chief Engineer, who had been with us for 46 years, since 1908, was most skeptical of Fiberglas and talked about leaving our employ, if we insisted on using Fiberglas insulations for our new warehouse.

In spite of this background, we decided to and did install Fiberglas for all of the insulation requirements of this new Mid-South warehouse, specifying the installation on the basis of the rated insulation values claimed by your company, the manufacturers. Our York Corp. refrigeration equipment capacity was likewise installed on the basis of your company's computed efficiency of the Fiberglas insulations.

We have been operating the Mid-South warehouse on an occupancy basis substantially in excess of the national average for refrigerated warehouses and have had what we consider fair tests for a fair period of time.

I am delighted to report that we, the owners, and Charles Conley and Alvis Clay, our company engineers, have been completely satisfied with the performance of this Fiberglas installation, and consider our new freezer facilities as the last word in insulation efficiency. In fact, Fiberglas has done a so much better job than you claimed it would do, that we find that we have excess refrigeration machinery and equipment, even after full allowance for a fair emergency load factor.

Our sole reason for writing you about this situation is our appreciation of your company's cooperation and help in constructing this facility.

Very truly yours,
MID-SOUTH REFRIGERATED WAREHOUSE COMPANY
By William W. Goodman
William W. Goodman, President

WWG:ljv

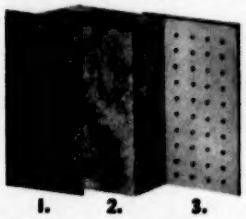
"Last word in efficiency!"

reports big Memphis cold storage plant on Fiberglas PF Dry Wall Construction

Proof that Fiberglas* PF Dry Wall Construction gives trouble-free service is found in the above letter from William W. Goodman, president of Mid-South Refrigerated Warehouse Company, Memphis, Tenn. Most significant of all is this statement—"Fiberglas has done a so much better job than you claimed it would do, that we find we have excess refrigeration machinery and equipment, even after full allowance for a fair emergency load factor."

Before you spend money for costly multiple-barrier insulations, get all the facts about Fiberglas PF for Dry Wall installation—the insulation that *stays dry . . . stays efficient.*

Mail the coupon today for the literature you would like to have! Owens-Corning Fiberglas Corporation, Toledo 1, Ohio.



How Fiberglas PF Dry Wall works. One highly efficient vapor barrier (1) holds back vapor. If any accidentally penetrates, it travels harmlessly through the inorganic PF insulation (2) and out into the room through the perforated wall finish (3). The insulation remains dry . . . with thermal efficiency unimpaired.

THE FINEST TRADEMARK OF
FIBERGLAS

*T. M. Reg. Owens-Corning Fiberglas Corporation

Owens-Corning Fiberglas Corporation
Dept. 165-B, Toledo 1, Ohio

Please send me the literature I have checked.

- ☐ "Insulation for Low Temperature Structures and Equipment"
- ☐ "PF Design Details"
- ☐ "Why the Trend is to Fiberglas"

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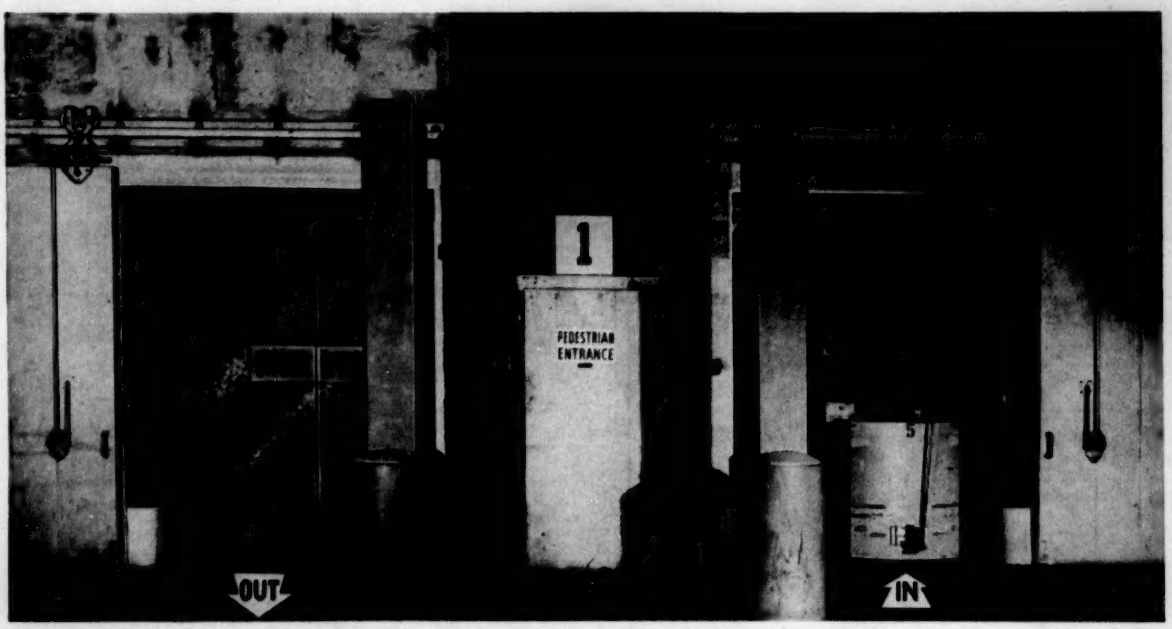
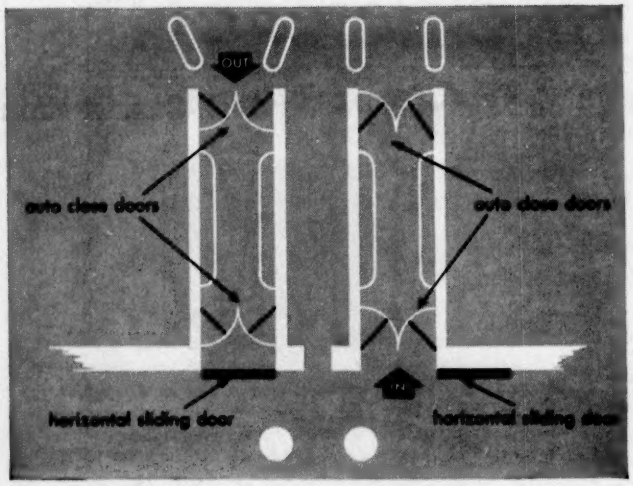


One-way door systems speed handling. Fork lift trucks enter —5°F freezer room at right and leave at left. To prevent interference with materials handling, a Jamison Super Freezer Door is installed in the center for pedestrian traffic.

Freezer Warehouse Uses Jamison Doors in Novel One-Way Traffic System



Vestibule icing problem solved. Two sets of Auto-Close Doors 24 feet apart form a vestibule that acts as an air lock. Ice and frost formation is prevented on doors and floor by a top-floor warming system and by air conditioning the vestibule.

With one-way traffic and dehumidified air locks, the Merchants Terminal Corporation establishes a new high for handling efficiency and refrigeration economy in its new Landover, Maryland, warehouse. Thirty-five Jamison Doors play a large part in this operation. For additional information about cold storage doors, consult your architect or write to JAMISON COLD STORAGE DOOR CO., HAGERSTOWN, MD.

Architect: Van Rensaler P. Saxe, Baltimore, Md.
Consultant: A. W. Ruff and Luke St. Onge
V. C. Patterson & Associates, York, Penna.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.